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December 8, 2020

Mr. John Paino
MassDEP
Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Re: Weymouth, MA Compressor Station Initial Performance Test Protocol

Dear Mr. Paino:

Please find the attached test protocol titled, "Weymouth Compressor Station Initial Performance Testing- Revision 02" that Canomara LLC has prepared for Algonquin Gas Transmission, LLC (AGT), a business unit of Enbridge, Inc. Initial performance testing will be conducted on one Solar Taurus 60-7802 natural gas fired turbine and one Waukesha VGF24GL emergency generator located at the Weymouth Compressor Station (54 Bridge Street in North Weymouth, MA). The purpose of the testing is to demonstrate compliance with the requirements of MassDEP Plan Approval Application Number SE-15-027 and to satisfy the requirements of 40 CFR 60 Subpart KKKK and 40 CFR 60 Subpart JJJJ.

The Weymouth Compressor Station is not currently in operation, therefore no test dates are proposed at this time. AGT/Enbridge will notify MassDEP prior to scheduling the initial performance test and testing will occur at mutually agreed upon dates. Should you have any questions or require further information, please do not hesitate to contact me at (860) 874-8920 or Frank Pike at (207) 217-0915.

Respectfully,
Canomara LLC



Evan Bali
Project Manager

cc: Frank Pike – Enbridge, Inc.

PROTOCOL

December 2020

Project Id: ENBR2020-11

Weymouth Compressor Station Initial Performance Testing- Rev. 02 Solar Turbine and Waukesha Generator

Prepared for

Algonquin Gas Transmission, LLC

Weymouth Compressor Station

54 Bridge Street

North Weymouth, MA 02191

Prepared by



Canomara LLC

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1 INTRODUCTION

1.1 Overview

Canomara LLC (CM) has been contracted by Algonquin Gas Transmission (AGT), a business unit of Enbridge, Inc. (Enbridge), to conduct compliance emissions testing on one newly installed Solar Taurus 60-7802 natural gas fired turbine and one newly installed Waukesha VGF24GL emergency generator located at the Weymouth Compressor Station at 54 Bridge Street in North Weymouth, MA. The purpose of the testing is to demonstrate compliance with the initial stack testing requirements of Massachusetts Department of Environmental Protection (MassDEP) Plan Approval Application Number SE-15-027. Testing will also satisfy the requirements of 40 CFR 60 Subpart KKKK and 40 CFR 60 Subpart JJJJ.

The Weymouth Compressor Station is not currently in operation, therefore no test dates are proposed at this time. AGT/Enbridge will notify MassDEP prior to scheduling the initial performance tests and testing will occur at mutually agreed upon dates.

1.2 Contact Information

Evan Bali of CM will be the project manager for the test program. Frank Pike of AGT/Enbridge will coordinate sampling with plant operations at the compressor station. Benjamin Wankim of AGT/Enbridge is the station supervisor. John Paino of MassDEP will observe the testing. Contact information is summarized below.

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2 SCOPE OF WORK

2.1 Test Matrix

CM will conduct emissions testing at the exhaust ductwork of the Solar Taurus 60 in accordance with US EPA test methods while the turbine is operating at plus or minus 25 percent of 100 percent peak load or the highest achievable load if 75 percent of peak load can't be achieved. The Weymouth Compressor Station is part of a load following system dependent on customer demand. Therefore, AGT isn't always able to control the load at which their compressor turbines operate. In the event that AGT is not able to reach 75% load during the initial performance testing, AGT will retest as soon as possible to achieve the load required as defined in the regulation. Table 2-1 contains the turbine test matrix.

CM will also conduct emissions testing at the exhaust stack of the Waukesha VGF24GL emergency generator in accordance with US EPA test methods while the generator is operating within 10 percent of 100 percent peak load. Table 2-2 contains the generator test matrix.

**Table 2-1: Solar Turbine Test Matrix
Weymouth Compressor Station**

Parameter	Methods ¹	Tests and Duration	MassDEP Limits ^{2,3}
Oxygen (O ₂) Carbon Dioxide (CO ₂)	EPA 3a	3, 60-minute	N/A
Oxides of Nitrogen (NO _x)	EPA 7e	3, 60-minute	9 ppmvd @ 15% O ₂ 0.94 tpm 10.03 tpy
Carbon Monoxide (CO)	EPA 10	3, 60-minute	1.25 ppmvd @ 15% O ₂ 2.18 tpm 17.28 tpy
Volatile Organic Compounds (VOC)	EPA 25a/18	3, 60-minute	2.4 ppmvd @ 15% O ₂ 0.30 tpm 2.64 tpy
Particulate Matter (PM/PM10/PM2.5) ¹	EPA 1-5/202	3, 240-minute	0.0066 lb/MMbtu 0.18 tpm 1.99 tpy
Formaldehyde	EPA 323 (mod)	3, 60-minute	0.05 tpm 0.42 tpy
Benzene	TO-15	3, 60-minute	0.05 tpm 0.42 tpy

1. PM10/PM2.5 will be conducted in accordance with EPA Method 5 and 202 where total particulate matter will be reported as PM10 by combining filterable and condensable particulate matter.
2. Federal limits (40 CFR 60 KKKK) for NO_x are 25 ppmvd @15% O₂ or 1.2 lb/MWh.
3. Limits apply to the turbine at ambient temperatures greater than 0 degrees F.

**Table 2-2: Emergency Generator Test Matrix
Weymouth Compressor Station**

Parameter	Methods¹	Tests and Duration	Emission Limits² (40CFR60 JJJJ)
O ₂ /CO ₂	EPA 3A	3, 60-minute	N/A
NO _x	EPA 7e	3, 60-minute	160 ppmvd @15% O ₂ 2.0 g/HP-hr
CO	EPA 10	3, 60-minute	540 ppmvd @15% O ₂ 4.0 g/HP-hr
VOC	EPA 18/25a	3, 60-minute	86 ppmvd @15% O ₂ 1.0 g/HP-hr

1. Emission rates will be determined using EPA Methods 1-4 or EPA Method 19 depending on availability of real time fuel flow data during the testing.
2. There are no MassDEP specific limits for the generator.

2.2 Test Schedule

Table 2-3 contains the schedule for the emissions testing.

Table 2-3: Test Schedule

Day	Activities	Crew Size	Time
1	Equipment Setup	4	8 hrs
2	Turbine- Two 240-minute tests	4	10 hrs
3	Turbine- One 240-minute test	4	8 hrs
4	Generator- Three 60-minute tests	4	8 hrs
5	Contingency	4	8 hrs

3 PROCESS DESCRIPTION

The Weymouth Compressor Station is located at 54 Bridge Street in North Weymouth, MA and is one of several compressor stations operated along Algonquin Gas Transmission LLC's interstate natural gas pipeline system.

The Solar Taurus 60-7802 compressor turbine is fired exclusively on pipeline quality natural gas and has a minimum Solar guarantee ISO rating of 7,451 hp and 67.14 MMBtu/hr. Solar's proprietary "So-Lo-NOx" staged combustion system is utilized for the control of NO_x emissions and the turbine is equipped with an oxidation catalyst.

Operating parameters will be recorded by the facility at minimum of 15-minute intervals during the turbine emissions testing. The following parameters will be recorded.

-) Fuel flow rate
-) Compressor suction and discharge pressures
-) Compressor suction and discharge temperatures
-) Turbine horsepower
-) Turbine and gas producer speeds
-) Turbine load percentage
-) Other available and pertinent data

The Waukesha VGF24GL emergency spark ignition engine generator set is fired exclusively on pipeline quality natural gas and is rated at 585 brake horsepower.

Operating parameters will be recorded by the facility at minimum of 15-minute intervals during the generator emissions testing. The following parameters will be recorded.

-) Fuel flow rate (if available, see Table 2-2)
-) KW output
-) Engine Speed
-) Other available and pertinent data

4 SAMPLING & ANALYTICAL PROCEDURES

Table 4-1 and 4-2 list the reference methods which will be followed to conduct emissions testing. Appendix A contains detailed descriptions of the methods to be used during this test program.

Table 4-1: Turbine Reference Methods

Method	Description
EPA 1	Sample and Velocity Traverses for Stationary Sources
EPA 2	Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)
EPA 3a	Determination of Oxygen and Carbon Dioxide Concentrations In Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA 4	Determination of Moisture Content in Stack Gases
EPA 5	Determination of Particulate Matter from Stationary Sources
EPA 7e	Determination of Nitrogen Oxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA 10	Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA 18	Gaseous Organic Compound Emissions by Gas Chromatography (Direct Interface Method)
EPA 25a	Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer
EPA 202	Method for Determining Condensable Particulate Emissions from Stationary Sources
EPA 323	Measurement of Formaldehyde Emissions from Natural Gas Fired Stationary Sources (modified)
TO-15	Determination of Volatile Organic Compounds in Air Collected in Specially Prepared Canisters and Analyzed by GC/MS

Table 4-2: Generator Reference Methods

Method ¹	Description
EPA 1	Sample and Velocity Traverses for Stationary Sources
EPA 2	Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)
EPA 3a	Determination of Oxygen and Carbon Dioxide Concentrations In Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA 4	Determination of Moisture Content in Stack Gases
EPA 7e	Determination of Nitrogen Oxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA 10	Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)
EPA 18	Gaseous Organic Compound Emissions by Gas Chromatography (Integrated Bag Sampling and Analysis)
EPA 25a	Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

1. Emission rates will be determined using EPA Methods 1-4 or EPA Method 19 depending on availability of real time fuel flow data during the testing.

Table 4-3 and 4-4 contain information about the instrumental reference method analyzers and measurement ranges to be used during this test program.

Table 4-3: Turbine Instrumental Reference Method Analyzers

Constituent	Analyzer	Detector	Span
O ₂	TAPI T200H	Paramagnetic	22 %
CO ₂	TAPI T300M	Non-Dispersive Infrared	18 %
NO _x	TAPI 200H	Chemiluminescent	25 ppm ¹
CO	TAPI T300M	Non-Dispersive Infrared	10 ppm
VOC	Vig 20 SRI 8610	Flame Ionization Gas Chromatography	10 ppm

1. A 10 ppm range may be used depending on the observed stack concentration.

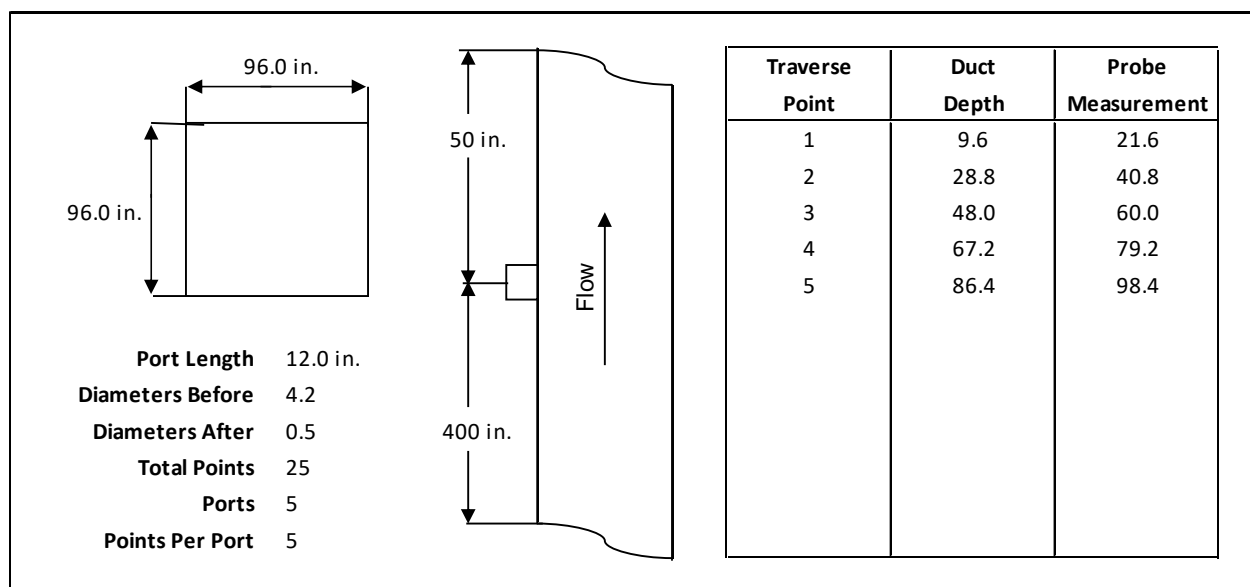
Table 4-4: Generator Instrumental Reference Method Analyzers

Constituent	Analyzer	Detector	Span
O ₂	TAPI T200H	Paramagnetic	22 %
CO ₂	TAPI T300M	Non-Dispersive Infrared	18 %
NO _x	TAPI 200H	Chemiluminescent	500 ppm
CO	TAPI T300M	Non-Dispersive Infrared	500 ppm
VOC	Vig 20 SRI 8610	Flame Ionization Gas Chromatography	4,500 ppm

4.1 Sampling Locations

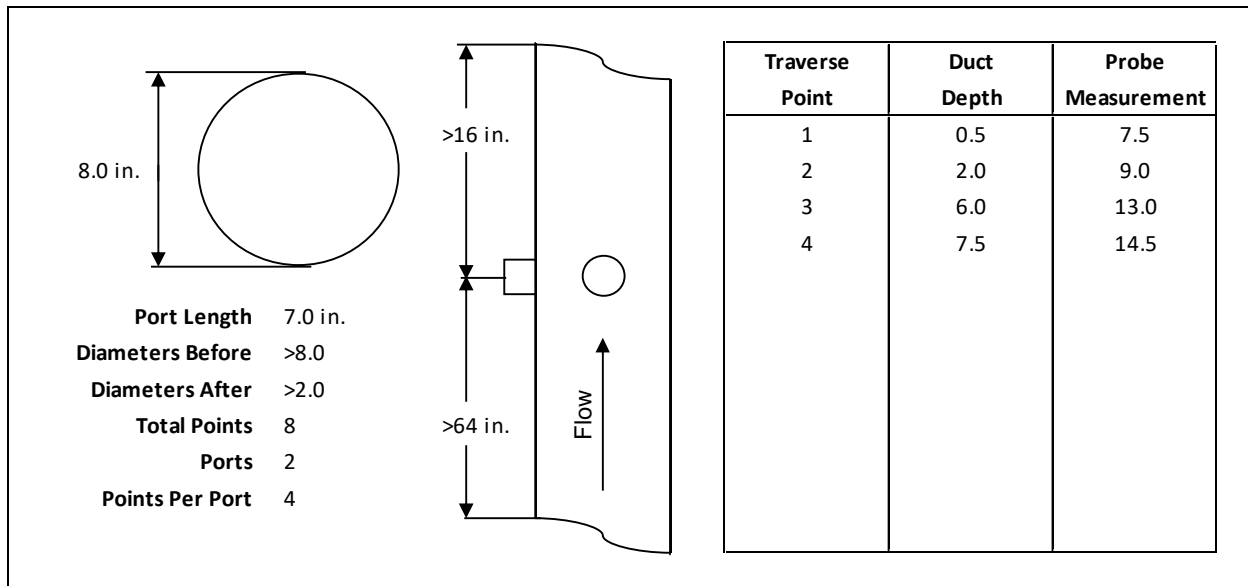
Turbine sampling will be conducted using five ports on the 96 x 96-inch horizontal exhaust duct prior to the vertical stack. A three-point stratification test will be conducted in accordance with EPA Method 7e and particulate traverse points for the turbine are presented in Figure 4-1. A photograph of the sample ports is located in Appendix B.

Figure 4-1: Turbine Traverse Points



The generator is equipped with two sampling ports in the 8-inch diameter stack. The generator ports are located more than 8 diameters downstream of a flow disturbance and more than 2 diameters upstream of the stack exit. A three-point stratification test will be conducted in accordance with EPA Method 7e and EPA Method 1 traverse points are shown in Figure 4-2. A photograph of the sample ports is located in Appendix C.

Figure 4-2: Generator Traverse Points



5 QUALITY ASSURANCE

CM's quality assurance program is designed so that work is performed by competent, experienced individuals using properly calibrated equipment, approved procedures for sample collection, recovery, and analysis and proper documentation. This ensures the integrity of data collected, processed, and reported on each project.

All final project deliverables are reviewed by an independent peer reviewer. Additional project specific quality assurance requirements are based on client contracts, local, state, or regional environmental regulations, and quality requirements and guidelines included in published sampling and analytical methods. Specific quality assurance procedures and acceptance criteria for this test program can be found in Appendix A.

APPENDIX A

SAMPLING METHODS

EPA Method 1

Sample and Velocity Traverses for Stationary Sources

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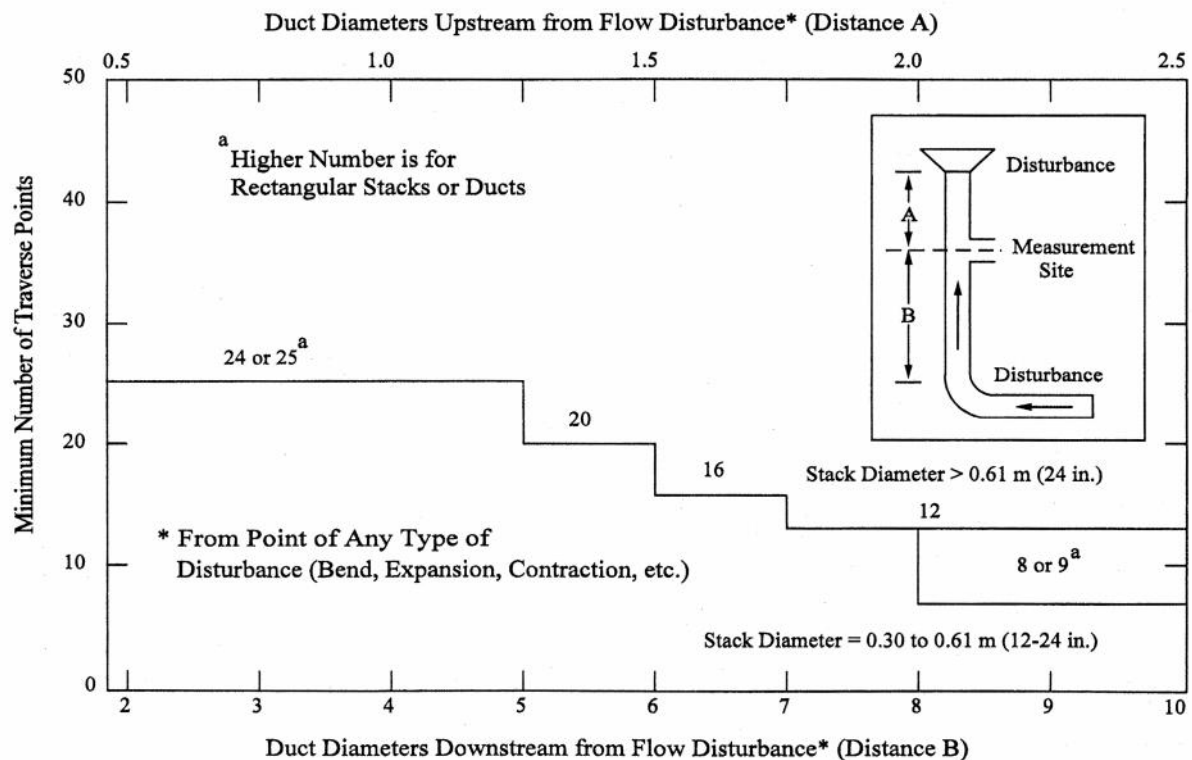
SUMMARY

A measurement site where the effluent stream is flowing in a known direction is selected, and the cross-section of the stack is divided into a number of equal areas. Traverse points are then located within each of these equal areas.

SITE SELECTION

- Sampling or velocity measurements must be taken at a position at least 2 stack diameters downstream and a half diameter upstream from any flow disturbance.
- The minimum allowed number of traverse points can be used when there is at least 8 stack diameters downstream and 2 stack diameters upstream.
- For particulate traverses refer to table 1 to determine the required number of traverse points
- For velocity traverses refer to table 2 to determine the required number of traverse points
- For circular stacks, locate the traverse points on two perpendicular diameters according to the diameter percentages listed in table 3.
- For rectangular stacks, divide the stack into as many equal areas as traverse points and locate each traverse point in the center of each area.
- Verify the absence of cyclonic flow using a Type S pitot tube and the manometer nulling technique.

Table 1
Particulate Traverses



Revised: 08/2/2018

EPA Method 1

Sample and Velocity Traverses for Stationary Sources

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Table 2
Velocity Traverses

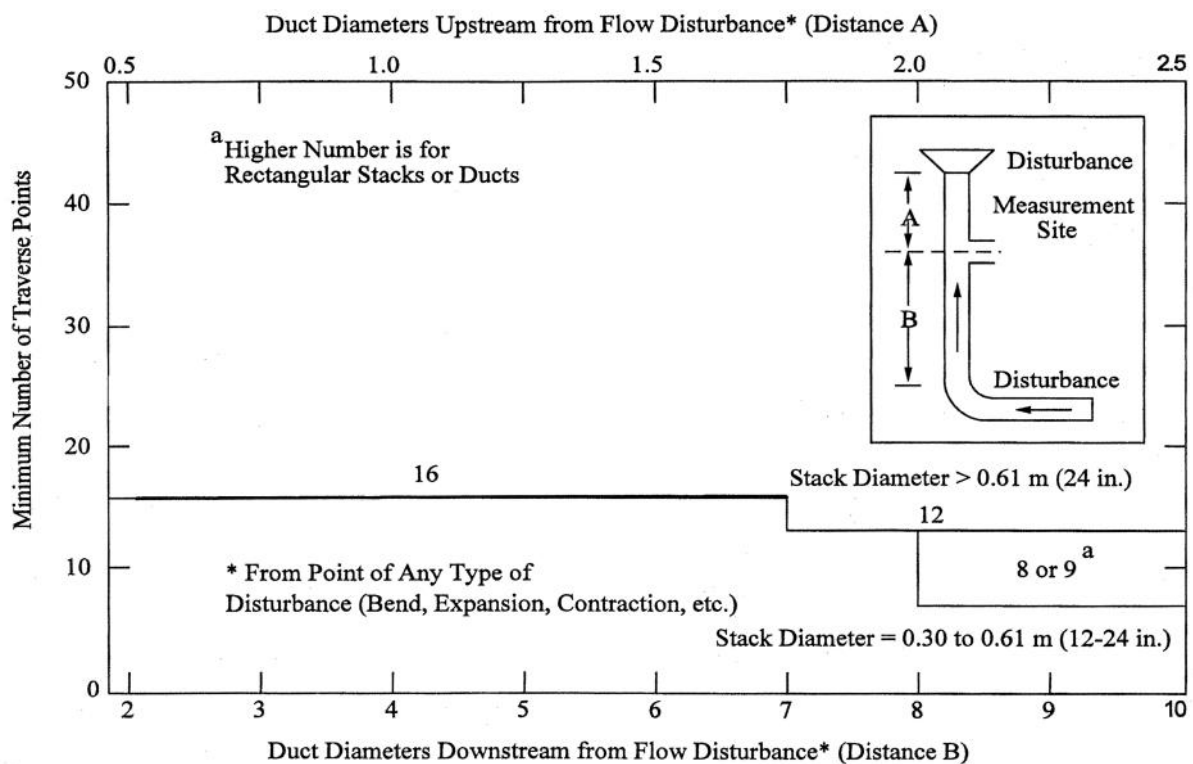


Table 3
Location of Traverse Points in Circular Stacks

Traverse Point	Number of Traverse Points on a Diameter				
	4	6	8	10	12
1	6.7	4.4	3.2	2.6	2.1
2	25.0	14.6	10.5	8.2	6.7
3	75.0	29.6	19.4	14.6	11.8
4	93.3	70.4	32.3	22.6	17.7
5		85.4	67.7	34.2	25.0
6		95.6	80.6	65.8	35.6
7			89.5	77.4	64.4
8			96.8	85.4	75.0
9				91.8	82.3
10				97.4	88.2
11					93.3
12					97.9

Revised: 08/2/2018

EPA Method 2

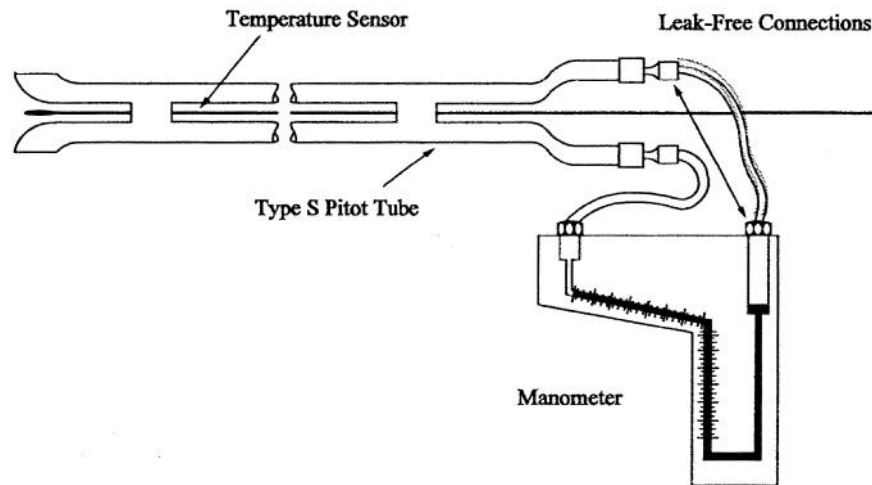
Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

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SUMMARY

The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S (Staustscheibe or reverse type) pitot tube.

MEASUREMENT EQUIPMENT



- Type S pitot tube constructed of stainless steel or other appropriate metal with a known coefficient.
- Leak free flexible tubing
- Differential pressure gauge such as in inclined manometer with a 10-inch water column with gradations of 0.01 - 0.1 inH₂O for p readings greater than 0.05 inH₂O.
- Temperature sensor such as a K-Type thermocouple attached to the pitot tube.

SAMPLING PROCEDURE

- It is recommended that a pre-test leak check be conducted by blowing into the positive side of the pitot tube until at least 3.0 inH₂O is registered on the manometer. Block off the opening and observe that the reading remains stable for at least 15 seconds. Follow the same procedure on the negative side of the pitot tube using suction.
- Measure velocity head and temperature and the traverse points determined by EPA Method 1.
- Measure the static pressure in the stack.
- Determine the atmospheric pressure.
- Determine the stack gas dry molecular weight using EPA Method 3 or 3a.
- Determine moisture content using EPA Method 4, wet-bulb/dry-bulb, or saturation.

QUALITY ASSURANCE

- Pitot tube calibration by either geometric or wind tunnel measurements.
- Thermocouple calibration using an ice bath and boiling water.
- Pitot tube leak checks conducted before and after each velocity traverse.
- Maintain a properly leveled and zeroed manometer.

Revised: 08/2/2018

EPA Method 3a

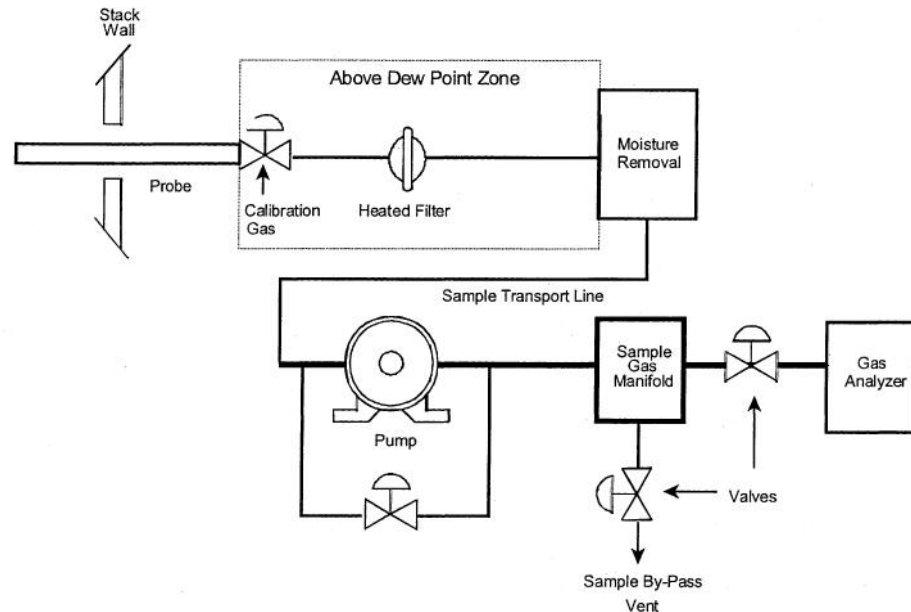
Determination of Oxygen and Carbon Dioxide Concentrations In Emissions from Stationary Sources (Instrumental Analyzer Procedure)

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SUMMARY

Effluent gas is continuously conveyed to an analyzer for measuring the concentration of O₂ or CO₂.

SAMPLING TRAIN



Components:

- Glass or stainless steel probe of sufficient length to traverse required sample points.
- An in-stack or out-of-stack filter made of material which is non-reactive to the sample gas. The filter is not required where no significant particulate matter is present.
- Sample line made of Teflon or other material that does not absorb or alter the sample gas.
- Condenser or dryer to remove moisture from the sample gas if measuring on a dry basis.
- Leak-free pump constructed of non-reactive material to pull sample through the system at a sufficient rate to minimize the response time.
- Manifold constructed of non-reactive material to allow the introduction of calibration gases either directly to the analyzer or into the measurement system at the probe and to direct a portion of the sample to the analyzer while diverting the rest of the sample to a by-pass discharge vent.
- Analyzer capable of meeting all performance requirements that continuously measures O₂ or CO₂.
- Computer based data acquisition system for recording measurements.

Revised: 08/2/2018

EPA Method 3a

Determination of Oxygen and Carbon Dioxide Concentrations In Emissions from Stationary Sources (Instrumental Analyzer Procedure)

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SAMPLING PROCEDURES

- Assemble the sampling system and conduct a leak check.
- Confirm that all calibration gas certifications are complete and not expired.
- Conduct an analyzer calibration error test.
- Conduct an initial system bias check and response time test.
- Perform a stratification test to determine the number of sample traverse points unless the measurement is only being used to determine the stack gas molecular weight in which case a single measurement point may be used.
- Position the probe at the first sampling point and purge the system for at least two times the response time. Traverse all required points sampling for equal time at each.
- Conduct a post-run system bias and drift assessment check.

QUALITY ASSURANCE

Measurement System:

- Calibration error is verified to be within $\pm 2\%$ of the calibration span or $\pm 0.5\%$ difference
- System bias is verified to be within $\pm 5\%$ of the calibration span or $\pm 0.5\%$ difference
- Drift is verified to be within $\pm 3\%$ of the calibration span or $\pm 0.5\%$ difference

O₂ or CO₂ Analyzer:

- Analyzer used for testing has undergone manufacturer interference checks
- Analyzer resolution is $< 2.0\%$ full-scale range

Calibration Gas:

- Calibration uncertainty of $\pm 2\%$ certified value
- Low-level gas $< 20\%$ of calibration span
- Mid-level gas 40-60% of calibration span
- High-level gas sets the calibration span with test measurements 20-100% of this value

Data:

- Data collection and calculations are conducted on a reviewed computer based system
- Data resolution $\pm 0.5\%$ full-scale range
- Data recording frequency of 1-minute average
- Minute averages \pm calibration span
- Run average \pm calibration span

Revised: 08/2/2018

EPA Method 3a

Determination of Oxygen and Carbon Dioxide Concentrations In Emissions from Stationary Sources (Instrumental Analyzer Procedure)

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CALCULATIONS

Analyzer Calibration Error:

$$ACE = \frac{C_{DIR} - C_V}{C} \times 100$$

ACE Analyzer calibration error, percent of calibration span

C_V Manufacturer certified concentration of a calibration gas (low, mid, high), ppmv

C_{DIR} Measured concentration of a calibration gas when introduced in direct calibration mode, ppmv

CS Calibration span, ppmv

System Bias:

$$SB = \frac{C_S - C_{DIR}}{C} \times 100$$

SB System bias, percent of calibration span

C_S Measured concentration of a calibration gas when introduced in system calibration mode, ppmv

CS Calibration span, ppmv

Drift Assessment:

$$D = SB_{final} - SB_i$$

D Drift assessment, percent of calibration span

SB_{final} Post-run system bias, percent of calibration span

SB_i Pre-run system bias, percent of calibration span

Effluent Gas Concentration:

$$C_{Gas} = (C_{Avg} - C_O) \times \frac{C_{MA}}{C_M - C_O}$$

C_{Gas} Average effluent gas concentration adjusted for bias, ppmv

C_{Avg} Average unadjusted gas concentration indicated by data recorder for the test run, ppmv

C_O Average of initial and final system bias responses from the low-level (or zero) calibration gas, ppmv

C_{MA} Actual concentration of the upscale calibration gas, ppmv

C_M Average of initial and final system bias responses for the upscale calibration gas, ppmv.

Revised: 08/2/2018



EPA Method 4

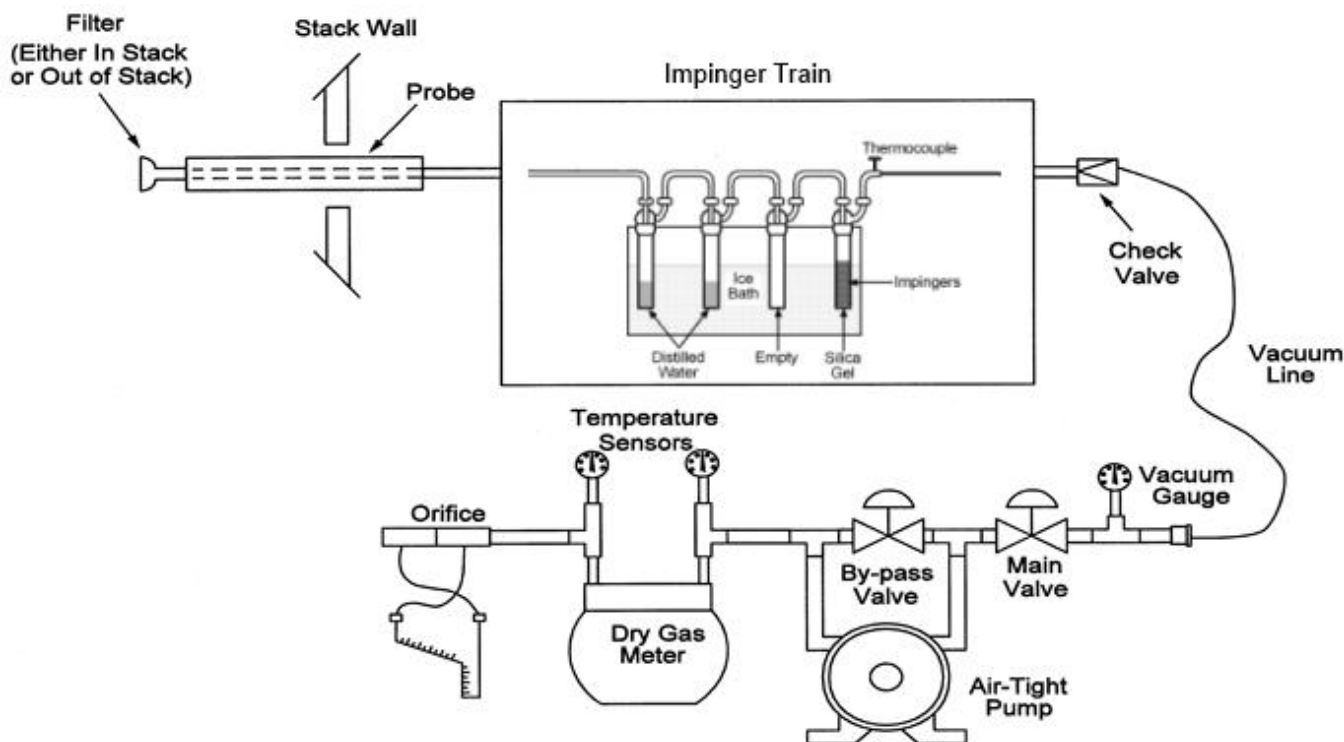
Determination of Moisture Content in Stack Gases

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SUMMARY

A gas sample is extracted from the source at a constant rate. Moisture is removed from the sample stream by condensation and moisture is determined either gravimetrically or volumetrically.

SAMPLING TRAIN



Components:

- Stainless steel or glass probe sufficiently heated to prevent condensation.
- In-stack or heated out-of-stack filter
- Teflon sample line
- 4 impingers connected in series placed in an ice bath (impinger exit < 68 °F)
 1. Modified Greenburg-Smith, ~100 ml water
 2. Greenburg-Smith, ~100 ml water
 3. Modified Greenburg-Smith, empty
 4. Modified Greenburg-Smith, indicating silica gel
- Umbilical with leak-free vacuum line
- Vacuum gauge, leak-free pump, temperature sensors and a calibrated dry gas meter
- Inclined manometer or equivalent for measuring orifice values

Revised: 08/2/2018

EPA Method 4

Determination of Moisture Content in Stack Gases

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SAMPLING PROCEDURES

- Weigh the impinger train.
- Conduct a leak check from the tip of the probe at a vacuum of 15 inHg. Ensure that the leak rate is 0.020 cfm before starting a test run.
- Place the probe at the first sampling point.
- Begin sampling at a rate of approximately 0.75 cubic feet per minute. Collect sample data every 10 minutes including delta H, impinger outlet temperature, and dry gas meter inlet and outlet temperature.
- Conduct a post-test leak check from the tip of the probe or first impinger at a vacuum higher than the highest vacuum observed during sampling.

RECOVERY PROCEDURES

- Weigh the impinger train.
- Record the difference between the Post and Pre impinger train weights.
- Calculate the moisture content.

QUALITY ASSURANCE

Equipment:

- Dry gas meters are calibrated annually and after each field program.
- All glassware is cleaned prior to field use.
- Impinger exit temperature is monitored during testing to verify compliance with method specification.
- A leak check is conducted post run at a vacuum equal to or greater than the maximum value reached during the test run.
- The dry gas meter calibration factor is verified after field use to be within 5% of the annual value.
- Temperature meters are calibrated annually and after each field use.

Data:

- Field data are recorded on prepared forms.
- Only reviewed spreadsheets are used to conduct data reduction calculations.
- All data and deliverables undergo peer review with a signoff form.

Revised: 08/2/2018



EPA Method 4

Determination of Moisture Content in Stack Gases

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CALCULATIONS

Dry Gas Volume:

$$V_{m(s)} = V_m Y \frac{T_s \left(P_b + \frac{\Delta}{13.6} \right)}{T_m P_s}$$

$V_{m(std)}$ Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf

V_m Volume of gas sample as measured by dry gas meter, dcf

Y Dry gas meter calibration factor

T_{std} Standard absolute temperature, 528 °R

P_{bar} Barometric pressure at the sampling site, inHg

H Average pressure differential across the orifice meter, inH₂O

T_m Absolute average DGM temperature, °R

P_{std} Standard absolute pressure, 29.92 inHg

Volume of Water Vapor Condensed:

$$V_{w(s)} = K_2 V_{lc}$$

$V_{w(std)}$ Volume of water vapor in the gas sample, corrected to standard conditions, scf

K_2 0.04706 ft/ml for English units

V_{lc} Total volume of liquid collected in impingers and silica gel

Moisture Content:

$$B_w = \frac{V_{w(s)}}{V_{m(s)} + V_{w(s)}}$$

B_{ws} Water vapor in the gas stream, proportion by volume

$V_{w(std)}$ Volume of water vapor in the gas sample, corrected to standard conditions, scf

EPA Method 5

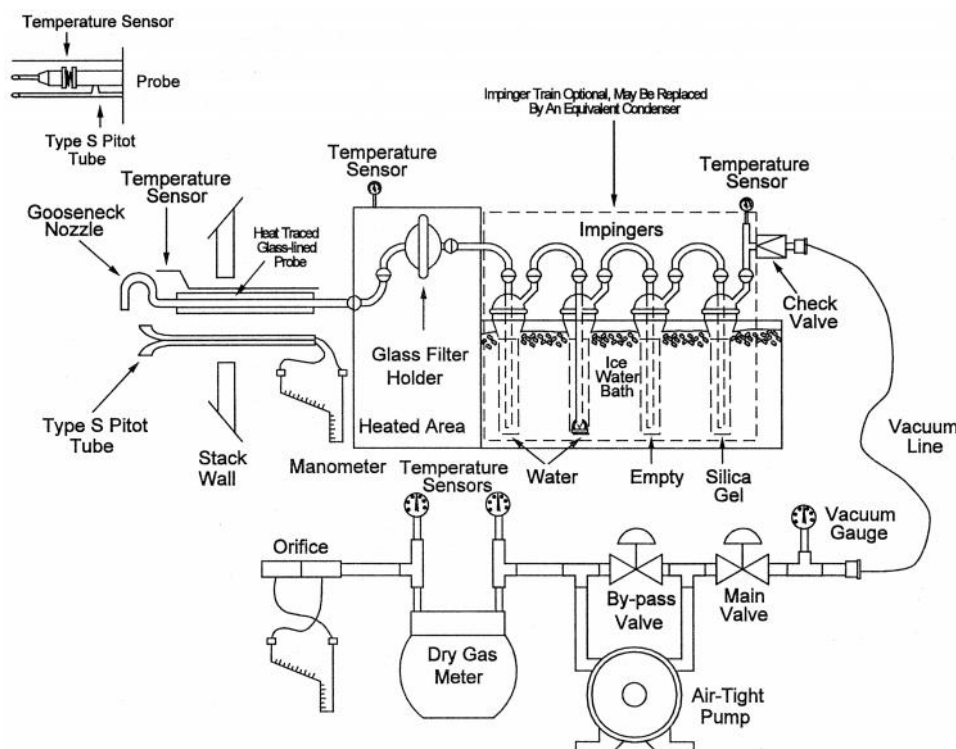
Determination of Particulate Matter from Stationary Sources

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SUMMARY

Particulate matter (PM) is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at a temperature of 248 ± 25 °F. The PM mass, including any material that condenses at or above the filtration temperature, is determined gravimetrically after the removal of uncombined water.

SAMPLING TRAIN



Components:

-) Stainless steel or glass button-hook nozzle with a sharp, tapered leading edge appropriately sized for isokinetic sampling
-) Heated quartz or borosilicate glass lined probe (248 ± 25 °F) with attached Type S pitot tube and Type K thermocouple
-) Heated 3-inch glass fiber filter in glass holder with Teflon frit (248 ± 25 °F)
-) 4 impingers connect in series placed in an ice bath (impinger exit 68 °F)
 1. Modified Greenburg-Smith, ~100 ml water
 2. Greenburg-Smith, ~100 ml water
 3. Modified Greenburg-Smith, empty
 4. Modified Greenburg-Smith, indicating silica gel
-) Umbilical with leak-free vacuum line
-) Vacuum gauge, leak-free pump, temperature sensors and a calibrated dry gas meter
-) Dual inclined manometer or equivalent for measuring velocity head and orifice values

Revised: 06/4/2020

EPA Method 5

Determination of Particulate Matter from Stationary Sources

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SAMPLING PROCEDURES

-) Select sampling site and minimum number of sampling points according to EPA Method 1. Mark an appropriately sized sampling probe with the points calculated for the location. Determine the sampling time per point 2 minutes.
-) Determine appropriate nozzle size necessary to maintain isokinetic sampling conditions based on stack pressure, temperature, and velocity head range according EPA Method 2, stack molecular weight according to EPA Method 3/3a, and stack moisture content according to EPA Method 4.
-) Calculate a k-factor based off the selected nozzle size and stack conditions. Assemble the sampling train as described above, weigh the impingers and place crushed ice around them.
-) Conduct a leak check from the tip of the nozzle at a vacuum of 15 inHg. Ensure that the leak rate is 0.020 cfm before starting a test run.
-) Place the probe at the first sampling point once all temperatures are within the required range.
-) Begin sampling, making adjustments as necessary to maintain isokinetic sampling rate within $\pm 10\%$.
-) Traverse the stack using the predetermined sampling points.
-) Conduct a post-test leak check at a vacuum higher than the highest vacuum observed during sampling.
-) Calculate % isokinetic for the run to validate the test.

RECOVERY PROCEDURES

-) Weigh the impingers to determine moisture gain.
-) Container 1 - Carefully remove the filter from its holder and place it in a labeled glass or polyethylene petri dish.
-) Container 2 – Rinse and brush the nozzle, probe liner, and front half of the filter holder with reagent grade acetone (0.001 % residue) into a labeled glass or polyethylene sample container with a Teflon or other chemically resistant screw cap liner.
-) Blank – Collect 200 ml of acetone from the wash bottle used to conduct recoveries into a labeled sample jar.

EPA Method 5

Determination of Particulate Matter from Stationary Sources

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QUALITY ASSURANCE

Equipment:

-) Pitot tubes, thermocouples, nozzles, and dry gas meters are calibrated annually.
-) All glassware is cleaned prior to field use.
-) Probe, filter, and impinger exit temperatures are carefully monitored during testing to ensure the values are maintained within the appropriate range.
-) The entire sampling train is leak checked post run from the tip of the nozzle at a vacuum equal to or greater than the maximum value reached during the test run.
-) Sampling rate is verified to be within 10% isokinetic variation (90%-110%).
-) The dry gas meter calibration factor is verified after field use to be within 5% of the annual value.

Samples:

-) New containers are used to collect samples.
-) Each sample container is clearly labeled.
-) A chain of custody is generated for all samples.
-) Samples are transported upright in protective packaging.

Data:

-) Field data are recorded on prepared forms.
-) Only reviewed spreadsheets are used to conduct data reduction calculations.
-) All data and deliverables undergo peer review with a signoff form.

EPA Method 5

Determination of Particulate Matter from Stationary Sources

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CALCULATIONS

Dry Gas Volume:

$$V_{m(s)} = V_m Y \frac{T_s \left(P_b + \frac{\Delta}{13.6} \right)}{T_m P_s}$$

$V_{m(std)}$ Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf

V_m Volume of gas sample as measured by dry gas meter, dcf

Y Dry gas meter calibration factor

T_{std} Standard absolute temperature, 528 °R

P_{bar} Barometric pressure at the sampling site, inHg

H Average pressure differential across the orifice meter, inH₂O

T_m Absolute average DGM temperature, °R

P_{std} Standard absolute pressure, 29.92 inHg

Volume of Water Vapor Condensed:

$$V_{w(s)} = K_2 V_{lc}$$

$V_{w(std)}$ Volume of water vapor in the gas sample, corrected to standard conditions, scf

K_2 0.04706 ft/ml for English units

V_{lc} Total volume of liquid collected in impingers and silica gel

Moisture Content:

$$B_w = \frac{V_{w(s)}}{V_{m(s)} + V_{w(s)}}$$

B_{ws} Water vapor in the gas stream, proportion by volume

$V_{w(std)}$ Volume of water vapor in the gas sample, corrected to standard conditions, scf

Particulate Concentration:

$$C_s = \frac{K_3 m_n}{V_{m(s)}}$$

C_s Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, gr/dscf

K_3 0.0154 gr/mg for English units

M_n Total amount of particulate matter collected, mg

Revised: 06/4/2020



EPA Method 5

Determination of Particulate Matter from Stationary Sources

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CALCULATIONS (CONTINUED)

Isokinetic Variation:

$$I = \frac{100T_s \left[K_4 V_{lc} + \frac{(V_m Y)}{T_m} \left(P_{bar} + \frac{\Delta H}{13.6} \right) \right]}{60 \theta v_s P_s A_n}$$

T_s	Absolute average stack gas temperature, °R
K_4	0.002669 ((inHg)(ft))/((ml)(°R)) for English units
V_{lc}	Total volume of liquid collected in impingers & silica gel, ml
	Total sampling time, min
V_s	Stack gas velocity, ft/sec
P_s	Absolute stack gas pressure, inHg
A_n	Cross-sectional area of nozzle, ft ²

Alternative Post-Test Dry Gas Meter Calibration (EPA Method 5, Section 16.3)

$$Y_{qa} = \frac{q}{V_m} \left(\frac{0.0319 (T_m + 460) \times 29}{DH_{@} [P_b + (DH_{avg}/13.6)] M_d} \right)^{0.5} (DH^{0.5})_{avg}$$

Y_{qa} = Dry gas meter calibration check value, dimensionless

q = Total run time, min

V_m = Total sample volume measured by dry gas meter, dcf

T_m = Average dry gas meter temperature, °F

P_b = Barometric pressure, in. Hg

0.0319 = (29.92/528)(0.75)² (in. Hg/°R) cfm²

DH_{avg} = Average orifice meter differential, in H₂O

$DH_{@}$ = Orifice meter calibration coefficient, in H₂O

M_d = Dry molecular weight of stack gas, lb/lb-mole

29 = Dry molecular weight of air, lb/lb-mole

13.6 = Specific gravity of mercury

$$\text{Difference} = \frac{(Y_{qa} - Y)}{Y} \text{ within } \pm 5\%$$

Revised: 06/4/2020



EPA Method 7e (with EPA Method 19 Emission Rate Calculation Using Oxygen-Based Fuel Factor)

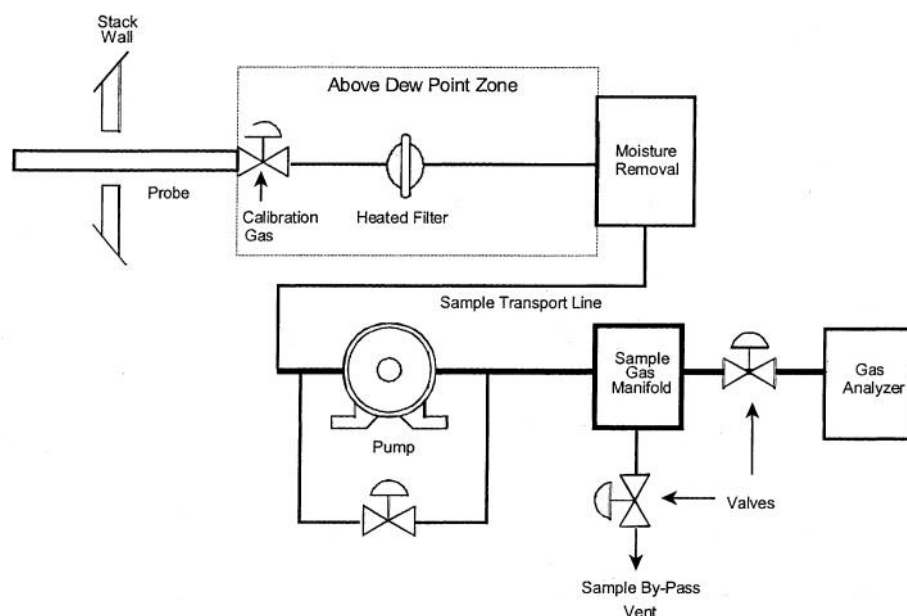
Determination of Nitrogen Oxides Emissions from Stationary Sources
(Instrumental Analyzer Procedure)

Page 1 / 4

SUMMARY

A sample of the effluent gas is continuously conveyed to the analyzer for measuring the concentration of NO_x as NO_2 . NO and NO_2 may be measured separately or simultaneously, but for the purposes of this method NO_x is the sum of NO and NO_2 .

SAMPLING TRAIN



Components:

-) Glass or stainless steel probe of sufficient length to traverse required sample points.
-) An in-stack or out-of-stack filter made of material which is non-reactive to the sample gas. The filter is not required where no significant particulate matter is present.
-) Heated sample line (250°F) made of Teflon or other material that does not absorb or alter the sample gas.
-) Condenser or dryer to remove moisture from the sample gas if measuring on a dry basis.
-) Leak-free pump constructed of non-reactive material to pull sample through the system at a sufficient rate to minimize the response time.
-) Manifold constructed of non-reactive material to allow the introduction of calibration gases either directly to the analyzer or into the measurement system at the probe and to direct a portion of the sample to the analyzer while diverting the rest of the sample to a by-pass discharge vent.
-) An analyzer capable of meeting all performance requirements that continuously measures NO_x .
-) Computer based data acquisition system for recording measurements.

Revised: 08/4/2020

EPA Method 7e (with EPA Method 19 Emission Rate Calculation Using Oxygen-Based Fuel Factor)

Determination of Nitrogen Oxides Emissions from Stationary Sources
(Instrumental Analyzer Procedure)

Page 2 / 4

SAMPLING PROCEDURES

-) Assemble the sampling system and conduct a leak check.
-) Confirm that all calibration gas certifications are complete and not expired.
-) Conduct an analyzer calibration error test.
-) Conduct an initial system bias check and response time test.
-) Conduct an NO₂ to NO conversion efficiency test if the analyzer being used performs this conversion to measure NO_x.
-) Perform a stratification test to determine the number of sample traverse points.
-) Position the probe at the first sampling point and purge the system for at least two times the response time. Traverse all required points sampling for equal time at each.
-) Conduct a post-run system bias and drift assessment check.

QUALITY ASSURANCE

Measurement System:

-) Calibration error is verified to be within $\pm 2\%$ of the calibration span or ± 0.5 ppmv difference
-) System bias is verified to be within $\pm 5\%$ of the calibration span or ± 0.5 ppmv difference
-) Drift is verified to be within $\pm 3\%$ of the calibration span or ± 0.5 ppmv difference

NO_x Analyzer:

-) Analyzer used for testing has undergone manufacturer interference checks
-) Analyzer resolution is $< 2.0\%$ full-scale range
-) Converter efficiency is verified to be 90% or demonstrate a decrease from NO_{xPeak} of 2%

Calibration Gas:

-) Calibration uncertainty of 2% certified value
-) Low-level gas $< 20\%$ of calibration span
-) Mid-level gas 40-60% of calibration span
-) High-level gas sets the calibration span with test measurements 20-100% of this value
-) Converter efficiency gas concentration is 40-60 ppm NO₂

Data:

-) Data collection and calculations are conducted on a reviewed computer based system
-) Data resolution 0.5% full-scale range
-) Data recording frequency of 1-minute average
-) Minute averages calibration span
-) Run average calibration span

Revised: 08/4/2020



EPA Method 7e (with EPA Method 19 Emission Rate Calculation Using Oxygen-Based Fuel Factor)

Determination of Nitrogen Oxides Emissions from Stationary Sources
(Instrumental Analyzer Procedure)

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CALCULATIONS

Analyzer Calibration Error:

$$ACE = \frac{C_{DIR} - C_V}{C} \times 100$$

ACE Analyzer calibration error, percent of calibration span

C_V Manufacturer certified concentration of a calibration gas (low, mid, high), ppmv

C_{DIR} Measured concentration of a calibration gas when introduced in direct calibration mode, ppmv

CS Calibration span, ppmv

System Bias:

$$SB = \frac{C_S - C_{DIR}}{C} \times 100$$

SB System bias, percent of calibration span

C_S Measured concentration of a calibration gas when introduced in system calibration mode, ppmv

CS Calibration span, ppmv

Drift Assessment:

$$D = SB_{final} - SB_i$$

D Drift assessment, percent of calibration span

SB_{final} Post-run system bias, percent of calibration span

SB_i Pre-run system bias, percent of calibration span

Effluent Gas Concentration:

$$C_{Gas} = (C_{Avg} - C_O) \times \frac{C_{MA}}{C_M - C_O}$$

C_{Gas} Average effluent gas concentration adjusted for bias, ppmv

C_{Avg} Average unadjusted gas concentration indicated by data recorder for the test run, ppmv

C_O Average of initial and final system bias responses from the low-level (or zero) calibration gas, ppmv

C_{MA} Actual concentration of the upscale calibration gas, ppmv

C_M Average of initial and final system bias responses for the upscale calibration gas, ppmv.

Revised: 08/4/2020



EPA Method 7e (with EPA Method 19 Emission Rate Calculation Using Oxygen-Based Fuel Factor)

Determination of Nitrogen Oxides Emissions from Stationary Sources
(Instrumental Analyzer Procedure)

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Emission Rate Calculation Using Oxygen-Based EPA Method 19

EPA Method 19 contains calculations (Equation 19-1) for determining mass emission rates using measured concentrations, heat input and either a published fuel factor or fuel factors calculated from an ultimate analysis. Equation 19-1 is an oxygen-based fuel factor calculation using dry basis pollutant and oxygen concentration measurements. Calculations are as follows:

$$E = C_d \times F_d \times 20.9 / (20.9 - \%O_2)$$

Method 19, Equation 19-1

Where,

E = emission rate in pounds per million Btu (lb/MMBtu)

C_d = dry concentration in pounds per dry standard cubic foot (lb/scf)

Conversions factors:

$$NO_x \text{ ppm} \times 1.194 \times 10^{-7} = NO_x \text{ lb/scf}$$

$$SO_2 \text{ ppm} \times 1.660 \times 10^{-7} = SO_2 \text{ lb/scf}$$

F_d = fuel factor in dry standard cubic feet per million Btu (dscf/MMBtu)

Method 19 published F_d factors for natural gas and oil are as follows:

Natural gas – 8710 dscf/MMBtu

Oil – 9190 dscf/MMBtu

Fuel factors may also be calculated from an ultimate analysis as follows:

$$F_d = \frac{K(K_{hd}\%H + K_c\%C + K_s\%S + K_n\%N - K_o\%O)}{GCV} \quad \text{Eq. 19-13}$$

$$K = 10^6 \text{ Btu/MMBtu}$$

$$K_{hd} = (3.64 \text{ scf/lb}) / \%$$

$$K_c = (1.53 \text{ scf/lb}) / \%$$

$$K_s = (0.57 \text{ scf/lb}) / \%$$

$$K_n = (0.14 \text{ scf/lb}) / \%$$

$$K_o = (0.46 \text{ scf/lb}) / \%$$

GCV = gross caloric value (Btu/lb)

EPA Method 10

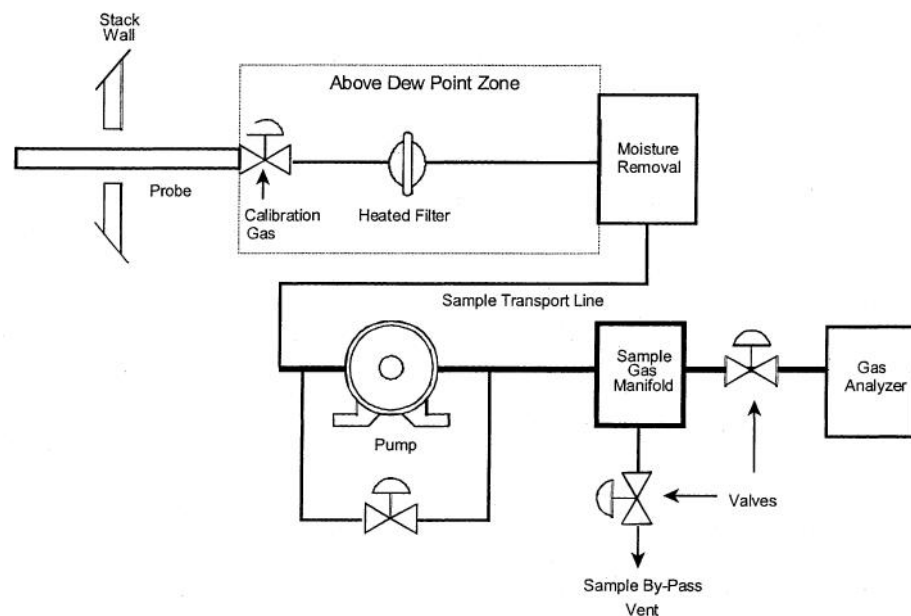
Determination of Carbon Monoxide Emissions from Stationary Sources
(Instrumental Analyzer Procedure)

Page 1 / 3

SUMMARY

Effluent gas is continuously conveyed to an analyzer for measuring the concentration of CO. Alternatively, sample gas may be collected in a Tedlar bag followed by analysis with a calibrated analyzer.

SAMPLING TRAIN



Components:

- Glass or stainless steel probe of sufficient length to traverse required sample points.
- An in-stack or out-of-stack filter made of material which is non-reactive to the sample gas. The filter is not required where no significant particulate matter is present.
- Heated Sample line (250°F) made of Teflon or other material that does not absorb or alter the sample gas.
- Condenser or dryer to remove moisture from the sample gas if measuring on a dry basis.
- Leak-free pump constructed of non-reactive material to pull sample through the system at a sufficient rate to minimize the response time.
- Manifold constructed of non-reactive material to allow the introduction of calibration gases either directly to the analyzer or into the measurement system at the probe and to direct a portion of the sample to the analyzer while diverting the rest of the sample to a by-pass discharge vent.
- An analyzer capable of meeting all performance requirements that continuously measures CO.
- Computer based data acquisition system for recording measurements.

Revised: 08/2/2018

EPA Method 10

Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)

Page 2 / 3

SAMPLING PROCEDURES

- Assemble the sampling system and conduct a leak check.
- Confirm that all calibration gas certifications are complete and not expired.
- Conduct an analyzer calibration error test.
- Conduct an initial system bias check and response time test.
- Perform a stratification test to determine the number of sample traverse points.
- Position the probe at the first sampling point and purge the system for at least two times the response time. Traverse all required points sampling for equal time at each.
- Conduct a post-run system bias and drift assessment check.

QUALITY ASSURANCE

Measurement System:

- Calibration error is verified to be within $\pm 2\%$ of the calibration span or ± 0.5 ppmv difference
- System bias is verified to be within $\pm 5\%$ of the calibration span or ± 0.5 ppmv difference
- Drift is verified to be within $\pm 3\%$ of the calibration span or ± 0.5 ppmv difference

CO Analyzer:

- Analyzer used for testing has undergone manufacturer interference checks
- Analyzer resolution is $< 2.0\%$ full-scale range

Calibration Gas:

- Calibration uncertainty of $\pm 2\%$ certified value
- Low-level gas $< 20\%$ of calibration span
- Mid-level gas 40-60% of calibration span
- High-level gas sets the calibration span with test measurements 20-100% of this value

Data:

- Data collection and calculations are conducted on a reviewed computer based system
- Data resolution $\pm 0.5\%$ full-scale range
- Data recording frequency of 1-minute average
- Minute averages \pm calibration span
- Run average \pm calibration span

Revised: 08/2/2018

EPA Method 10

Determination of Carbon Monoxide Emissions from Stationary Sources
(Instrumental Analyzer Procedure)

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CALCULATIONS

Analyzer Calibration Error:

$$ACE = \frac{C_{DIR} - C_V}{C} \times 100$$

ACE Analyzer calibration error, percent of calibration span

C_V Manufacturer certified concentration of a calibration gas (low, mid, high), ppmv

C_{DIR} Measured concentration of a calibration gas when introduced in direct calibration mode, ppmv

CS Calibration span, ppmv

System Bias:

$$SB = \frac{C_S - C_{DIR}}{C} \times 100$$

SB System bias, percent of calibration span

C_S Measured concentration of a calibration gas when introduced in system calibration mode, ppmv

CS Calibration span, ppmv

Drift Assessment:

$$D = SB_{final} - SB_i$$

D Drift assessment, percent of calibration span

SB_{final} Post-run system bias, percent of calibration span

SB_i Pre-run system bias, percent of calibration span

Effluent Gas Concentration:

$$C_{Gas} = (C_{Avg} - C_O) \times \frac{C_{MA}}{C_M - C_O}$$

C_{Gas} Average effluent gas concentration adjusted for bias, ppmv

C_{Avg} Average unadjusted gas concentration indicated by data recorder for the test run, ppmv

C_O Average of initial and final system bias responses from the low-level (or zero) calibration gas, ppmv

C_{MA} Actual concentration of the upscale calibration gas, ppmv

C_M Average of initial and final system bias responses for the upscale calibration gas, ppmv.

Revised: 08/2/2018



EPA Method 18

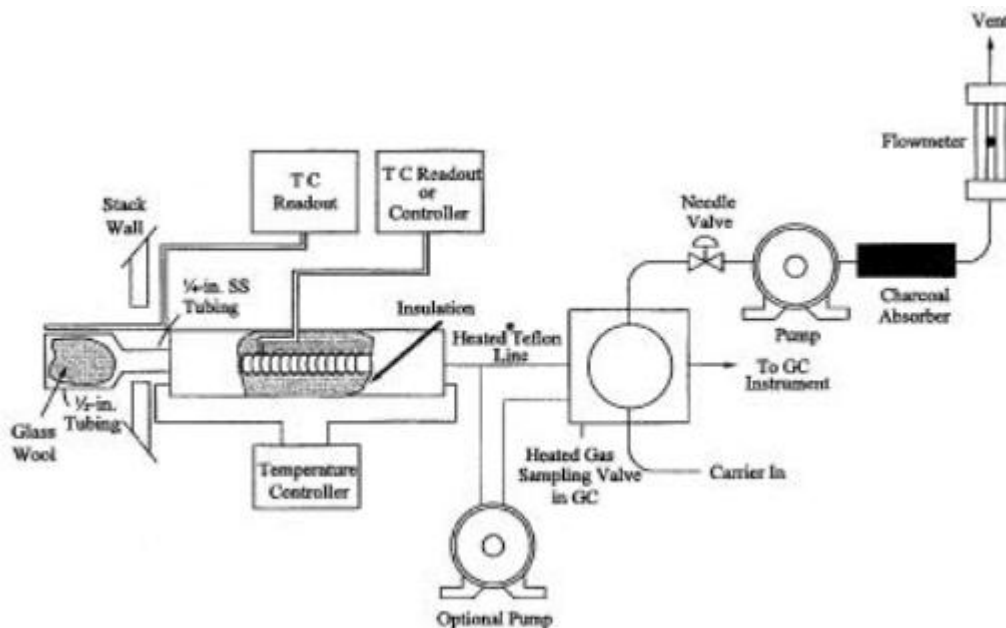
Gaseous Organic Compound Emissions by Gas Chromatography (Direct Interface Method)

Page 1 / 5

SUMMARY

Sample gas is continuously pumped through Teflon tubing to a gas chromatograph (GC) which analyzes a gas sample periodically for volatile organic compounds. A sampling train schematic is shown below and photographs are attached.

SAMPLING TRAIN



Sampling Components:

- ⌋ Glass or stainless steel probe of sufficient length to reach required sample points.
- ⌋ An in-stack or out-of-stack filter made of material which is non-reactive to the sample gas. The filter is not required where no significant particulate matter is present.
- ⌋ Sample line made of Teflon or other material that does not absorb or alter the sample gas. The sample line is heated to 110 °C.
- ⌋ Gas flow meter or critical orifice flow controller
- ⌋ Leak-free pump constructed of non-reactive material to pull sample through the system at a sufficient rate to minimize the response time.

Analytical Components

- ⌋ SRI Inc. Model 8610C gas chromatograph, laptop computer with Peaksimple software and USB cable
- ⌋ Restek MXT-1 60 meter steel capillary column (test protocol will specify other column type if required)
- ⌋ High purity hydrogen, nitrogen and air
- ⌋ CGA 350, 580 and 590 gas cylinder regulators with 1/8-inch tubing connectors
- ⌋ 1,000 cc gas syringe
- ⌋ Printer (optional as all chromatography files are saved)

Revised: 11/16/2018

EPA Method 18

Gaseous Organic Compound Emissions by Gas Chromatography (Direct Interface Method)

Page 2 / 5

SAMPLING PROCEDURES

-) Assemble the sampling system and conduct a vacuum leak check.
-) For critical orifice flow controllers, calibrate the sampling rate with a gas flow calibrator.
-) Position the probe at the first sampling point and purge the system for at least two times the response time.
-) Program GC software to inject samples at specified time intervals

ANALYTICAL PROCEDURES

-) Set up SRI Model 8610C chromatograph in accordance with manufacturer specifications.
-) Confirm that all calibration gas certifications are complete and not expired.
-) Conduct a 3-level calibration on the gas chromatograph for each target compound using commercially available gas standards. Each gas standard must be analyzed three times and the responses must be within 5% of the mean for each target compound.
-) Conduct a pre-test recovery study as per Section 8.4.1. Inject the mid-level calibration gas at the probe exit so that the gas passes through the entire sampling system (filter, heated line and pump). The measured concentration of at least one target compound must be within 10% of the certified value.
-) Insert probe to the center of stack or for large stacks to an insertion depth of at least 1 meter.
-) Program Peaksimple to automatically inject sample gas at specified intervals. Each run must include at least 5 sample analyses.
-) After completing sample analyses, re-analyze the mid-level calibration gas in triplicate. If the average value of each target compound is within 5% of the initial value, the initial calibration can be used to quantify the samples. If the post-test calibration varies by more than 5% of the initial calibration, then the 3-point calibration must be repeated and both pre and post-test calibrations must be used for sample quantification.

QUALITY ASSURANCE

Sampling System:

-) Sample flow rate should be $\pm 2\%$.
-) Leak rate should be 0.00 liters per minute at 5 inches Hg vacuum

Chromatography Analysis:

-) Standards, samples and spikes must be analyzed in triplicate and responses must be within 5% of the mean.
-) System spiked recovery as per Method 18, Section 8.4.1, must be within 10% of the analyzer response for at least one compound.

Calibration Gas:

-) Calibration uncertainty of $\pm 2\%$ certified value
-) Gas used only prior to expiration date

Revised: 11/16/2018



EPA Method 18

Gaseous Organic Compound Emissions by Gas Chromatography (Direct Interface Method)

Page 3 / 5

CALCULATIONS

Triplicate Injection:

$$\text{Dev} = \frac{(\text{RP}_{\text{avg}} - \text{RP})}{R} \times 100$$

RP Chromatograph response in area units

RP_{avg} Average response of three injections

Dev Deviation from the mean value

Drift Assessment:

$$D = \text{SB}_{\text{final}} - \text{SB}_i$$

D Drift assessment, percent of calibration span

SB_{final} Post-run system response for the mid-level gas

SB_i Pre-run system response for the mid-level gas

Spike Recovery Correction:

EPA Method 18 with the direct interface sampling option does not include a spike recovery correction. The calibration gas is injected as close as possible to the probe inlet and the response for at least one compound must be within $\pm 10\%$ of the certified value.

Detection Limit

Detection limit is determined by analyzing the low standard seven times and applying a standard statistical analysis. An example of the detection limit determination is shown below.

Standard Conc (ppm)	Response (ppm) ¹							Average	Standard Deviation	MDL (ppm) ²
	1	2	3	4	5	6	7			
1.00	1.181	1.129	1.166	1.171	1.183	1.185	1.182	1.1710	0.020	0.062

1. The low standard is analyzed 7 consecutive times.

2. MDL (ppm) = STDEV x 3.143

STDEV = standard deviation of the response for 7 injections of the low standard

3.143 = Student T-value for n-1 degrees of freedom at a 99% confidence

Revised: 11/16/2018



EPA Method 18

Gaseous Organic Compound Emissions by Gas Chromatography (Direct Interface Method)

Page 4 / 5

CALCULATIONS (CONTINUED)

Mass Emission Rate

Pollutant mass emission rate in pounds per hour (lb/hour) is calculated from the measured concentration and exhaust gas flow rate as follows:

$$ER = \text{ppmw} \times \text{molecular weight} \times \text{scfm} \times 15.58 \times 10^{-8}$$

ER = emission rate (lb/hour)

ppmw = parts per million by volume – wet basis

scfm = standard cubic feet per minute (wet)

Mass Basis Destruction Efficiency

Mass basis destruction efficiency is calculated with measured pollutant flow rates at the control device inlet and outlet using the following calculation:

$$\text{Destruction Efficiency (\%)} = (ER_{\text{in}} - ER_{\text{out}}) / ER_{\text{in}} \times 100$$

ER_{in} = control device inlet pollutant flow rate (lb/hour)

ER_{out} = control device outlet pollutant flow rate (lb/hour)

EPA Method 18

Gaseous Organic Compound Emissions by Gas Chromatography
(Direct Interface Method)

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COMPONENT IMAGES

SRI, Inc. Model 8610C Gas Chromatograph:



Revised: 11/16/2018

EPA Method 25a

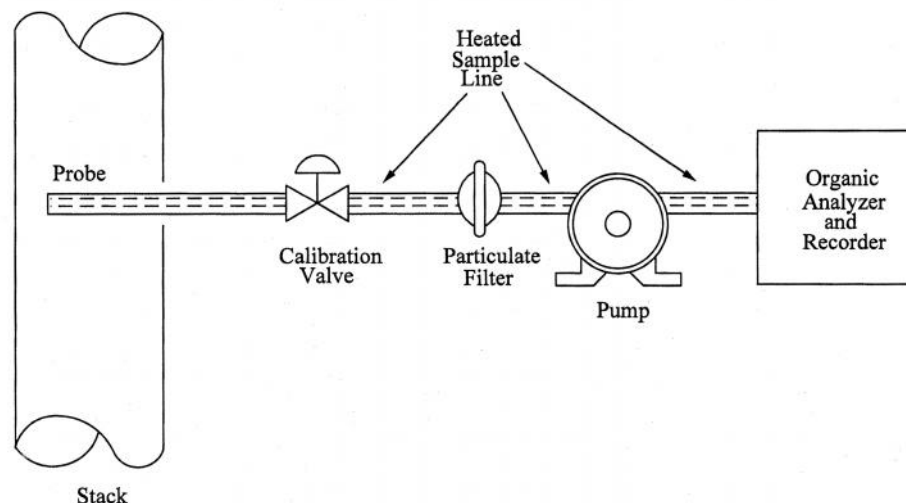
Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

Page 1 / 3

SUMMARY

A gas sample is extracted from the source through a heated sample line and glass fiber filter to a flame ionization analyzer.

SAMPLING TRAIN



Components:

- Stainless steel probe heated to 220 °F.
- A glass fiber in-stack filter or a glass fiber out-of-stack filter heated to 220 °F. The filter is not required where no significant particulate matter is present.
- Teflon or stainless steel sample line heated to 220 °F.
- Leak-free pump constructed of non-reactive material to pull sample through the system at a sufficient rate to minimize the response time.
- Manifold constructed of non-reactive material to allow the introduction of calibration gases into the measurement system at the probe.
- Flame ionization analyzer capable of meeting all performance requirements.
- Computer based data acquisition system for recording measurements.

Revised: 08/2/2018

EPA Method 25a

Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

Page 2 / 3

SAMPLING PROCEDURES

- Assemble the sampling system and conduct a leak check.
- Confirm that all calibration gas certifications are complete and not expired.
- Conduct an analyzer calibration error test sending gas through the entire measurement system.
- Conduct a response time test.
- Position the probe so that sample is collected from the centrally located 10% area of the stack.
- Begin sampling after 2 times the sampling response time has passed.
- Conduct a post-run drift assessment check.

QUALITY ASSURANCE

Measurement System:

- Calibration error is verified to be within $\pm 5\%$ of the calibration gas value
- Drift is verified to be within $\pm 3\%$ of the span value

Analyzer:

- Analyzer used for testing has undergone manufacturer interference checks
- Analyzer resolution is $< 2.0\%$ full-scale range

Calibration and Support Gas:

- Calibration uncertainty of 2% certified value
- High purity air zero gas < 0.1 ppmv organic material
- Low-level calibration gas 25-35% of the applicable span value
- Mid-level gas 45-55% of the applicable span value
- High-level gas 80-90% of the applicable span value
- Fuel consisting of 100% H_2

Data:

- Data collection and calculations are conducted on a reviewed computer based system
- Data resolution 0.5% full-scale range
- Data recording frequency of 1-minute average
- Minute averages calibration span
- Run average calibration span

Revised: 08/2/2018



EPA Method 25a

Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

Page 3 / 3

CALCULATIONS

Analyzer Calibration Error:

$$ACE = \frac{C_S - C_V}{C_V} \times 100$$

ACE Analyzer calibration error, percent of calibration gas value

C_S Measured concentration of a calibration gas through the sampling system, ppmv

C_V Manufacturer certified concentration of a calibration gas (low, mid, high), ppmv

Drift Assessment:

$$D = \frac{C_S - C_i}{C} \times 100$$

D Drift assessment, percent of span

C_S Measured concentration of a calibration gas through the sampling system, ppmv

C_i Initial analyzer response, ppmv

C Calibration span, ppmv

EPA Method 202

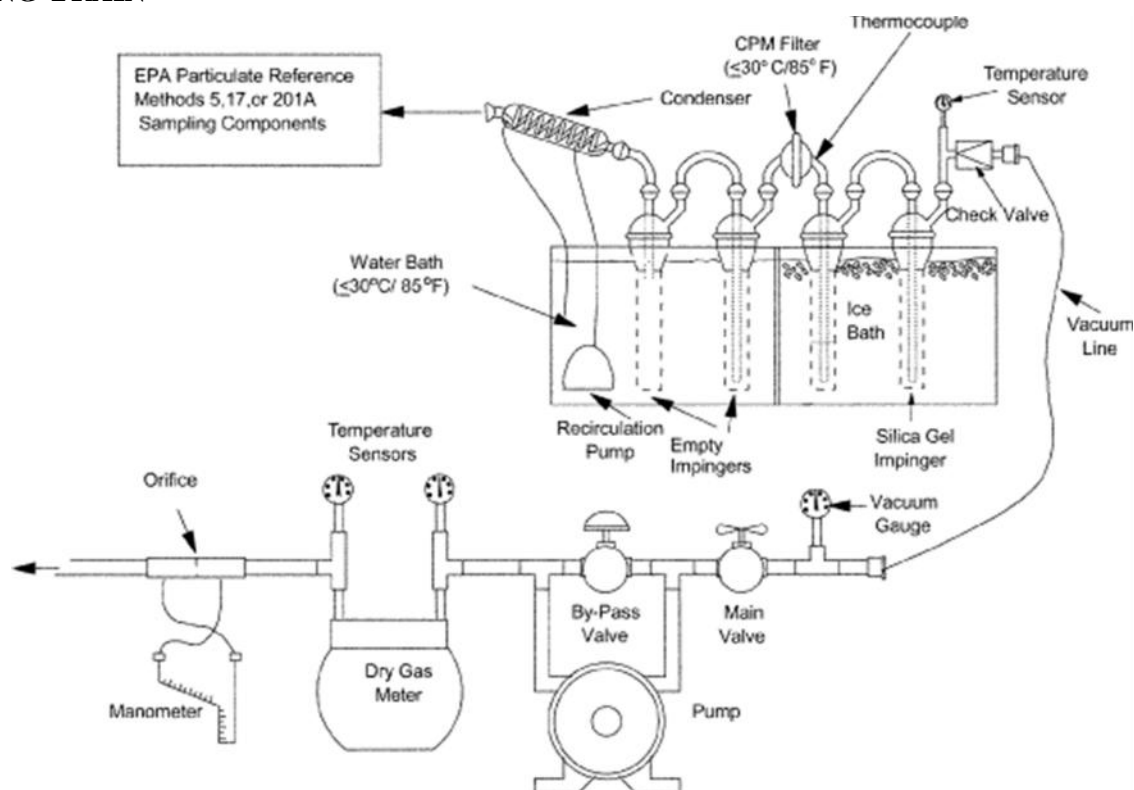
Method for Determining Condensable Particulate Emissions from Stationary Sources.

Page 1 / 5

SUMMARY

Particulate matter (PM) is withdrawn isokinetically from the source in accordance with EPA Methods 5, 17 or 201A. The Method 5, 17 and 201A front half sampling train components remove filterable particulate matter before the sample gas is drawn through the Method 202 components to collect condensable particulate matter (CPM). The Method 202 sampling train components begin with a glass coil condenser, followed by two dry impingers, and a Teflon filter. Condensate collected in the dry impingers and on the Teflon filter is recovered. The condensate and filter are extracted and organic and aqueous fractions are dessicated and weighed to determine the mass of total CPM.

SAMPLING TRAIN



Components:

- 1. Glass spiral condenser
 - 2. 2 impingers connected in series (85 °F)
 - 1. dropout impinger, empty
 - 2. modified Greenburg-Smith impinger, empty
 - 1. Glass or stainless steel filter holder and Teflon filter with thermocouple (65 °F and 85 °F)
 - 2. 2 impingers connect in series placed in an ice bath (impinger exit 68 °F)
 - 1. Modified Greenburg-Smith, 100 ml H₂O
 - 2. Modified Greenburg-Smith, indicating silica gel
- 1. Umbilical with leak-free vacuum line
- 1. Vacuum gauge, leak-free pump, temperature sensors and a calibrated dry gas meter
- 1. Dual inclined manometer or equivalent for measuring velocity head and orifice values

Revised: 06/4/2020

EPA Method 202

Method for Determining Condensable Particulate Emissions from Stationary Sources.

Page 2 / 5

SAMPLING PROCEDURES

-) Select sampling site and minimum number of sampling points according to EPA Method 1. Refer to Method 4, 17 or 201A for sampling specifications
-) Assemble the Method 202 sampling train components as shown above, weigh the impingers, place water around the first two impingers, activate the condenser recirculation pump, and place crushed ice around the third and fourth impingers.
-) Conduct a leak check from the tip of the nozzle at a vacuum equal to or greater than the highest anticipated during testing. Ensure that the leak rate is 0.020 cfm before starting a test run.
-) Place the probe at the first sampling point.
-) Begin sampling at the isokinetic rate in accordance with EPA Methods 5, 17 or 201A.
-) Traverse the stack using the predetermined sampling points.
-) Conduct a post-test leak check at a vacuum higher than the highest vacuum observed during sampling.

RECOVERY PROCEDURES

-) Weigh the impingers to determine moisture gain.
-) Conduct a pressurized purge of the CPM train by transferring water collected in the condenser and dropout impinger into the backup impinger. If the tip of the backup impinger does not extend below the water level, add a measured amount of degassed, deionized ultra-filtered water. Purge at a minimum of 14 liters per minute using filtered ultra-high purity nitrogen.
-) Container 1 (Aqueous liquid impinger contents) – Quantitatively transfer liquid from the dropout and the impinger prior to the CPM filter into a clean sample bottle (glass or plastic). Rinse the probe extension, condenser, each impinger and the connecting glassware, and the front half of the CPM filter twice with water. Recover the rinse water and add it to the same sample bottle. Mark the liquid level on the bottle.
-) Container 2 (Organic rinses) – Rinse the probe extension, condenser, each impinger and the connecting glassware, and the front half of the CPM filter twice with acetone. Then repeat the entire rinse procedure with two rinses of hexane, and save the hexane rinses in the same container as the acetone rinse. Mark the liquid level on the bottle.
-) Container 3 (CPM filter) – Place the filter in a labeled petri dish.
-) Acetone Field Reagent Blank – Take 200 ml of acetone directly from the wash bottle and place it in a clean, leak-proof container. Mark the liquid level on the bottle.
-) Water Field Reagent Blank – Take 200 ml of water directly from the wash bottle and place it in a clean, leak-proof container. Mark the liquid level on the bottle.
-) Hexane Field Reagent Blank – Take 200 ml of water directly from the wash bottle and place it in a clean, leak-proof container. Mark the liquid level on the bottle.
-) Field Train Recover Blank – After the first or second run, add 100 ml of water to the first impinger, purge and recover the assembled train as above. This blank weight will be subtracted from the field sample weights (max of 2.0 mg).

Revised: 06/4/2020



EPA Method 202

Method for Determining Condensable Particulate Emissions from Stationary Sources.

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ANALYTICAL PROCEDURES

-) Container 3 – Conduct triplicate extractions of the inorganic fraction of the CPM filter using deionized, ultra-filtered water and combine with container 1. Conduct triplicate extractions of the organic fraction of the CPM filter using hexane and combine with container 2.
-) Container 1 – Use hexane to extract the organic fraction and add it to container 2. Transfer the remaining aqueous fraction to a tarred beaker, evaporate to dryness, desiccate for 24 hours, and weigh to a constant weight to the nearest 0.1 mg.
-) Container 2 – Transfer the organic fraction to a tarred beaker, evaporate to dryness, desiccate for 24 hours, and weigh to a constant weight to the nearest 0.1 mg.
-) Acetone Field Reagent Blank - Transfer 150 ml of the acetone to a tarred beaker, evaporate to dryness at room temperature and pressure in a laboratory hood, desiccate for 24 hours, and weigh to a constant weight to the nearest 0.1 mg.
-) Water Field Reagent Blank - Transfer 150 ml of the water to a tarred beaker, evaporate to dryness, desiccate for 24 hours, and weigh to a constant weight to the nearest 0.1 mg.
-) Hexane Field Reagent Blank - Transfer 150 ml of the hexane to a tarred beaker, evaporate to dryness at room temperature and pressure in a laboratory hood, desiccate for 24 hours, and weigh to a constant weight to the nearest 0.1 mg.
-) Field Train Recover Blank – Analyze following the same procedures as above.

QUALITY ASSURANCE

Equipment

-) Pitot tubes, thermocouples, nozzles, and dry gas meters are calibrated annually.
-) All glassware is cleaned and baked (6 hours at 300 °C) prior to field use.
-) Probe, filter, and impinger exit temperatures are carefully monitored during testing to ensure the values are maintained within the appropriate range.
-) The entire sampling train is leak checked post run from the tip of the nozzle at a vacuum equal to or greater than the maximum value reached during the test run.
-) Sampling rate is verified to be within 10% isokinetic variation (90%-110%).
-) The dry gas meter calibration factor is verified after field use to be within 5% of the annual value.

Samples

-) New containers are used to collect samples.
-) Each sample container is clearly labeled.
-) A chain of custody is generated for all samples.
-) Samples are transported upright in protective packaging.

Data

-) Field data are recorded on prepared forms.
-) Only reviewed spreadsheets are used to conduct data reduction calculations.
-) All data and deliverables undergo peer review with a signoff form.

Revised: 06/4/2020



EPA Method 202

Method for Determining Condensable Particulate Emissions from Stationary Sources.

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CALCULATIONS

Dry Gas Volume:

$$V_{m(s)} = V_m Y \frac{T_s \left(P_{bar} + \frac{\Delta}{13.6} \right)}{T_m P_s}$$

$V_{m(std)}$	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf
V_m	Volume of gas sample as measured by dry gas meter, dcf
Y	Dry gas meter calibration factor
T_{std}	Standard absolute temperature, 528 °R
P_{bar}	Barometric pressure at the sampling site, inHg
H	Average pressure differential across the orifice meter, inH ₂ O
T_m	Absolute average DGM temperature, °R
P_{std}	Standard absolute pressure, 29.92 inHg

Volume of Water Vapor Condensed:

$$V_{w(s)} = K_2 V_{lc}$$

$V_{w(std)}$	Volume of water vapor in the gas sample, corrected to standard conditions, scf
K_2	0.04706 ft/ml for English units
V_{lc}	Total volume of liquid collected in impingers and silica gel

Moisture Content:

$$B_w = \frac{V_{w(s)}}{V_{m(s)} + V_{w(s)}}$$

B_{ws}	Water vapor in the gas stream, proportion by volume
$V_{w(std)}$	Volume of water vapor in the gas sample, corrected to standard conditions, scf

Condensable Particulate Matter (CPM) Concentration:

$$C_{cr} = \frac{m_{cl}}{V_{m(s)}}$$

C_{cpm}	Concentration of condensable particulate matter in stack gas, dry basis, corrected to standard conditions, mg/dscf
M_{cpm}	Total amount of condensable particulate matter collected, mg

Revised: 06/4/2020



EPA Method 202

Method for Determining Condensable Particulate Emissions from Stationary Sources.

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CALCULATIONS (CONTINUED)

Isokinetic Variation:

$$I = \frac{100T_s \left[K_4 V_{li} + \frac{(V_m Y)}{T_m} \left(P_{bar} + \frac{\Delta H}{13.6} \right) \right]}{60 \theta v_s P_s A_n}$$

T_s	Absolute average stack gas temperature, °R
K_4	0.002669 ((inHg)(ft))/((ml)(°R)) for English units
V_{li}	Total volume of liquid collected in impingers & silica gel, ml
	Total sampling time, min
V_s	Stack gas velocity, ft/sec
P_s	Absolute stack gas pressure, inHg
A_n	Cross-sectional area of nozzle, ft ²

Revised: 06/4/2020



EPA Method 323

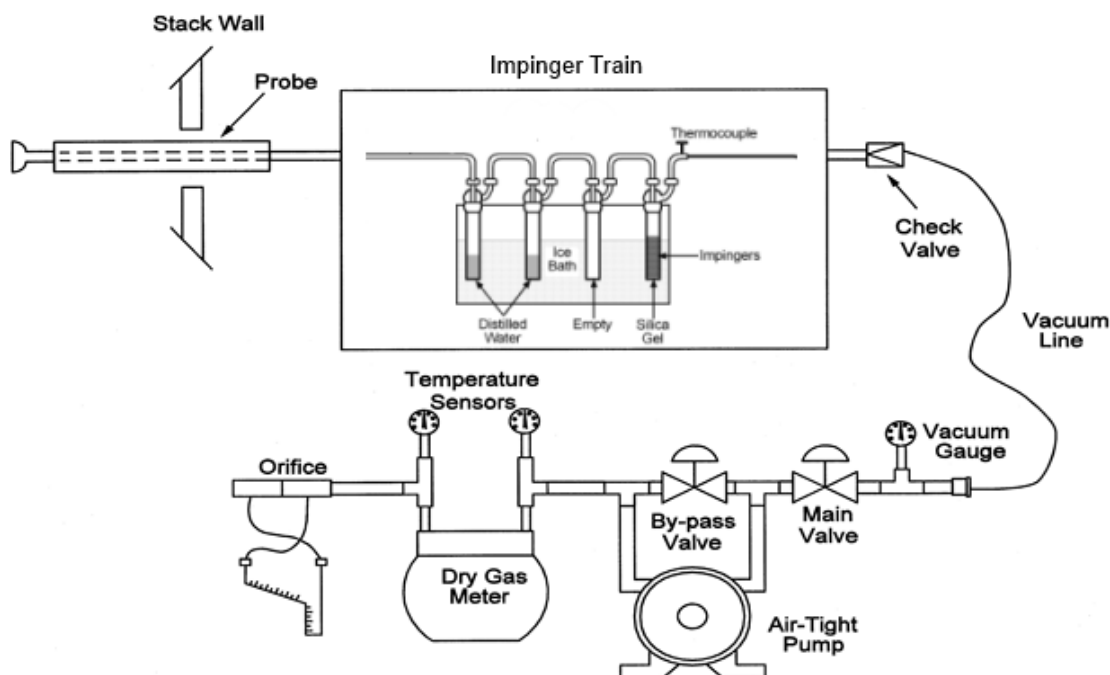
Measurement of Formaldehyde Emissions From Natural Gas-Fired Stationary Sources (modified)

Page 1 / 4

SUMMARY

This procedure describes a modified version of EPA Method 323 for sampling and analysis of formaldehyde emissions in the exhaust of natural gas-fired stationary combustion sources. The modifications provide for dramatically lower detection limits required for testing low emitting sources. An emission sample from the combustion exhaust is drawn through an impinger train containing chilled reagent water to absorb formaldehyde. The formaldehyde concentration in the impinger is determined using the modified pararosaniline method. Formaldehyde in the sample reacts with acidic pararosaniline and sodium sulfite, forming a purple chromophore. The intensity of the purple color, measured spectrophotometrically, provides an accurate and precise measure of the formaldehyde concentration in the sample.

SAMPLING TRAIN



Components:

- Glass or quartz lined probe sufficiently heated to prevent condensation.
- 4 impingers connected in series and placed in an ice bath (impinger exit < 68 °F)
 1. Modified Greenburg-Smith, ~100 ml water
 2. Greenburg-Smith, ~100 ml water
 3. Modified Greenburg-Smith, empty
 4. Modified Greenburg-Smith, indicating silica gel
- Umbilical with leak-free vacuum line
- Vacuum gauge, leak-free pump, temperature sensors and a calibrated dry gas meter
- Inclined manometer or equivalent for measuring orifice values

Revised: 07/12/2019

EPA Method 323

Measurement of Formaldehyde Emissions From Natural Gas-Fired Stationary Sources (modified)

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SAMPLING PROCEDURES

- Weigh the impinger train.
- Conduct a leak check from the tip of the probe. Ensure leak rate is ≤ 0.020 cfm before starting a test run.
- Place the probe at the desired sampling point and record the initial dry gas meter reading.
- Begin sampling at a rate of approximately 0.75 cubic feet per minute. Collect sample data every 10 minutes including delta H, impinger outlet temperature, and dry gas meter inlet and outlet temperature.
- At the end of the sampling period, close the coarse adjust valve and record the final dry gas meter reading.
- Conduct a post-test leak check from the tip of the probe at a vacuum higher than observed during sampling.

RECOVERY PROCEDURES

- Weigh the impinger train and calculate the moisture content.
- Container 1 – Transfer the impinger contents to a 500 ml wide-mouth polyethylene bottle. Rinse the probe, first three impingers, and connecting glassware and collect in the same container as the impinger contents. Tighten the lid, mark the fluid level, and label the contents.
- Container 2 – Blank – Transfer reagent water into a 500 ml wide-mouth polyethylene bottle equivalent in quantity to the total collected for the sample. Tighten the lid, mark the fluid level, and label the contents.
- Samples should be stored on ice and analyzed within 14-days of collection.

ANALYTICAL PROCEDURES

- Analyze samples following the modified pararosaniline method described in section 11 of EPA Method 316.

EPA Method 323

Measurement of Formaldehyde Emissions From Natural Gas-Fired Stationary Sources (modified)

Page 3 / 4

QUALITY ASSURANCE

Equipment:

- Dry gas meters are calibrated annually and after each field program.
- All glassware is cleaned prior to field use.
- Impinger exit temperature is monitored during testing to verify compliance with method specification.
- A leak checked is conducted post run at a vacuum equal to or greater than the maximum value reached during the test run.
- The dry gas meter calibration factor is verified after field use to be within 5% of the annual value.

Samples:

- New containers are used to collect samples.
- Each sample container is clearly labeled.
- A chain of custody is generated for all samples.
- Samples are transported upright in protective packaging on ice.

Data:

- Field data are recorded on prepared forms.
- Only reviewed spreadsheets are used to conduct data reduction calculations.
- All data and deliverables undergo peer review.

EPA Method 323

Measurement of Formaldehyde Emissions From Natural Gas-Fired Stationary Sources (modified)

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CALCULATIONS

Dry Gas Volume:

$$V_{m(std)} = V_m Y \frac{T_{std} \left(P_{bar} + \frac{\Delta H}{13.6} \right)}{T_m P_{std}}$$

$V_{m(std)}$	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf
V_m	Volume of gas sample as measured by dry gas meter, dcf
Y	Dry gas meter calibration factor
T_{std}	Standard absolute temperature, 528 °R
P_{bar}	Barometric pressure at the sampling site, inHg
ΔH	Average pressure differential across the orifice meter, inH ₂ O
T_m	Absolute average DGM temperature, °R
P_{std}	Standard absolute pressure, 29.92 inHg

Volume of Water Vapor Condensed:

$$V_{w(std)} = K_2 V_{lc}$$

$V_{w(std)}$	Volume of water vapor in the gas sample, corrected to standard conditions, scf
K_2	0.04706 ft/ml for English units
V_{lc}	Total volume of liquid collected in impingers and silica gel

Moisture Content:

$$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$$

B_{ws}	Water vapor in the gas stream, proportion by volume
$V_{w(std)}$	Volume of water vapor in the gas sample, corrected to standard conditions, scf

Formaldehyde Concentration:

$$C_{s\ CH_2O} = \frac{24.05\ N}{28.3168\ V_{mstd}\ MW}$$

N	Formaldehyde concentration, µg
MW	Molecular weight of formaldehyde, 30.031 g/mol

Revised: 07/12/2019



EPA Method TO-15

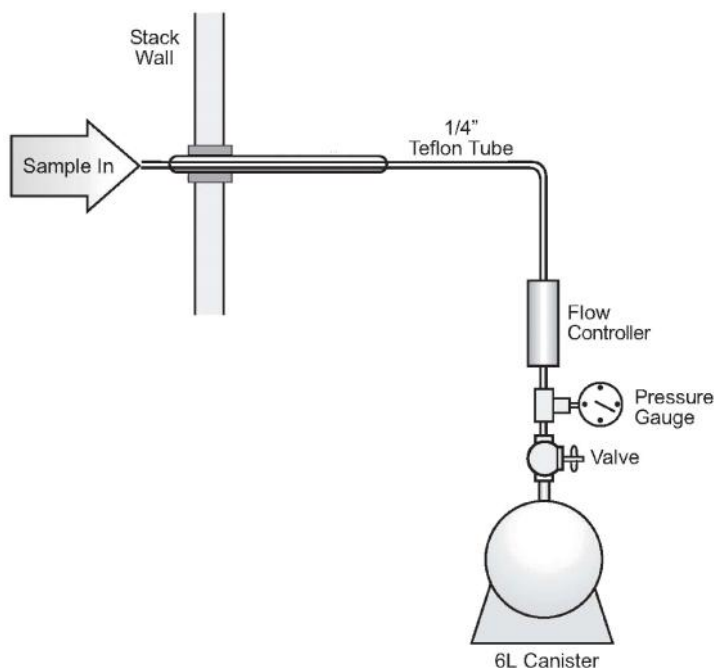
Determination of Volatile Organic Compounds (VOCs) In Air (Canister Sampling)

Page 1 / 1

SUMMARY

Gas is collected using an evacuated stainless-steel sample canister and analyzed by gas chromatography mass spectrometry (GC/MS) for volatile organic compounds.

SAMPLING TRAIN



Components:

-) Sample line of Teflon tubing with 1/4 inch outside diameter.
-) Flow controller designed to sample at a constant rate throughout the sampling period.
-) Pressure gauge.
-) Valve
-) Stainless steel 6-liter sample canister

SAMPLING PROCEDURES

-) Assemble the sampling system as described above.
-) Open valve to begin sampling.
-) Record sampling data including time and pressure readings on a prepared form.
-) Close valve to end sampling.
-) Disconnect canister, cap, and label.

QUALITY ASSURANCE

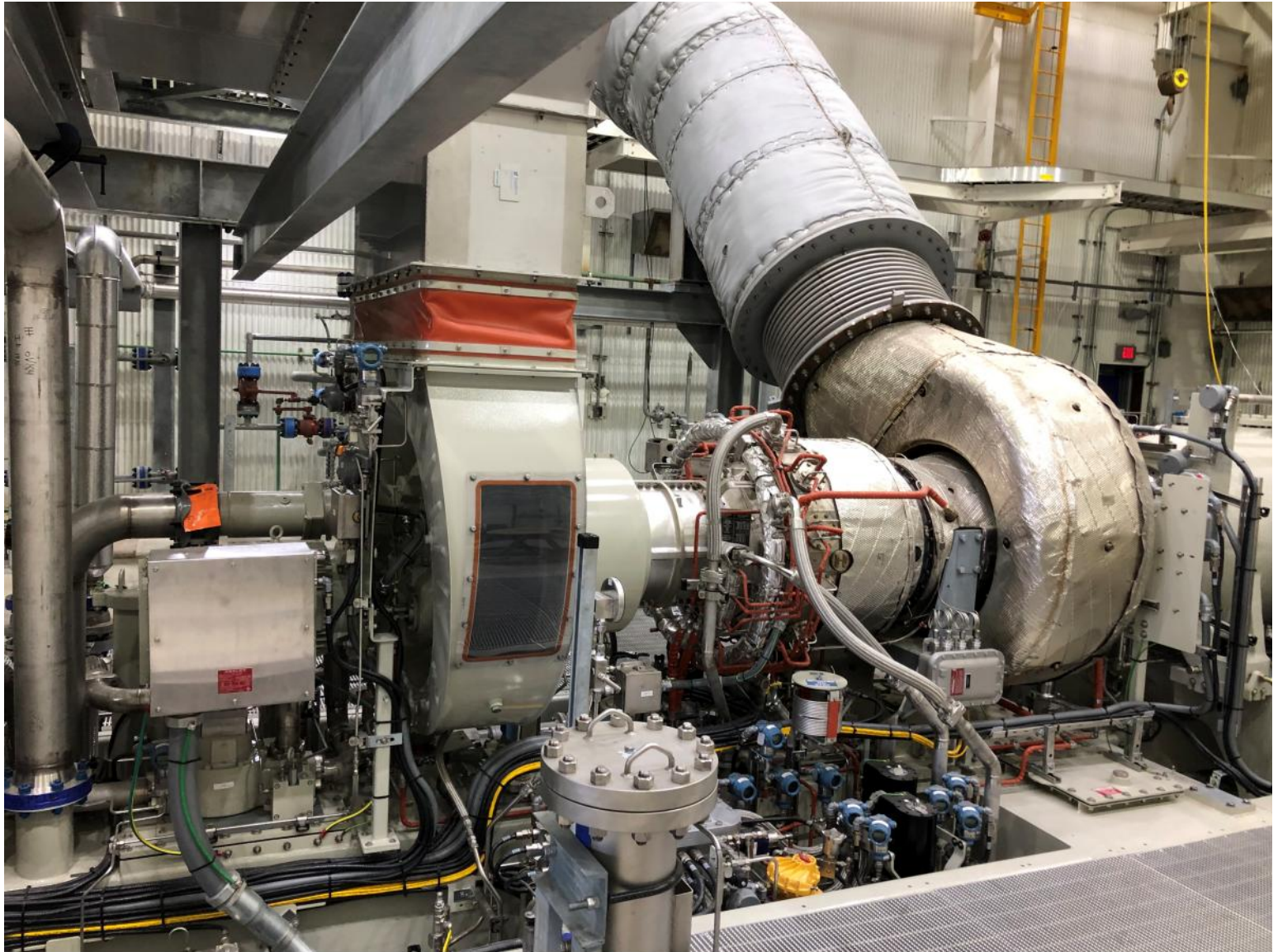
-) Sample line kept as short as feasible.
-) Canisters are cleaned and leak checked in the lab prior to sampling.

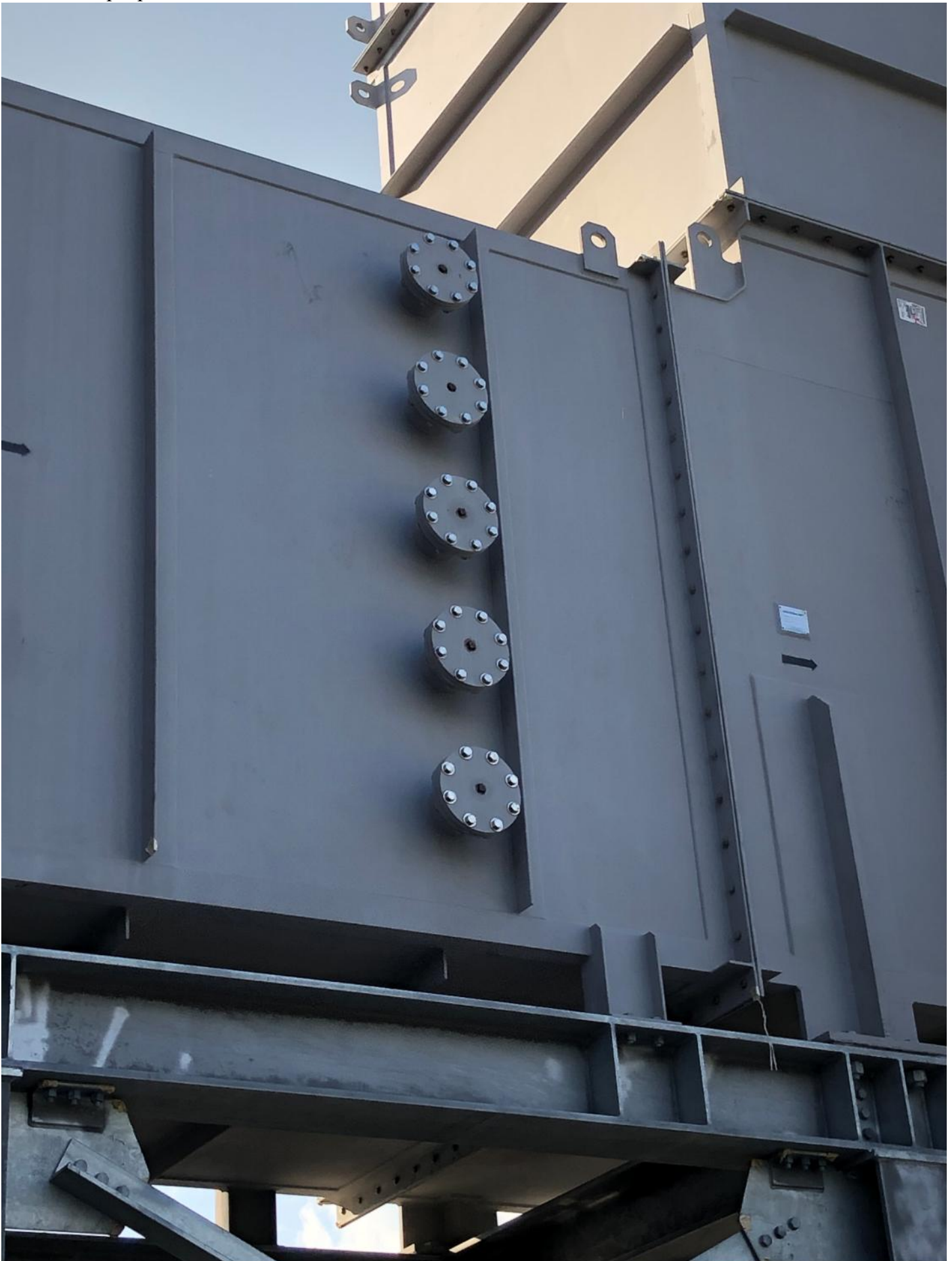
Revised: 10/16/2020

APPENDIX B

TURBINE EXHAUST PHOTOGRAPHS

Solar Taurus 60 Turbine





APPENDIX C

GENERATOR EXHAUST PHOTOGRAPHS

Waukesha emergency generator





APPENDIX D
MASSDEP PLAN APPROVAL



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

Mr. Thomas Wooden Jr.
Vice President, Field Operations
Algonquin Gas Transmission, LLC
P.O. Box 1642
Houston, TX 77251-1642

RE: Weymouth
Transmittal No.: X266786
Application No.: SE-15-027
Class: SM-25
FMF No.: 571926
AIR QUALITY PLAN APPROVAL

Dear Mr. Wooden:

The Massachusetts Department of Environmental Protection ("MassDEP"), Bureau of Air and Waste, has reviewed your Non-Major Comprehensive Plan Application ("Application") dated October 2015 with revisions dated May 25, 2018 and a revised Sound Impact Assessment Report dated October 15, 2018. This Application concerns the proposed construction of a new natural gas compressor station ("Project") located at 50 Bridge Street in Weymouth, Massachusetts. The revised Application bears the seal and signature of Lynne Santos, Massachusetts Registered Professional Engineer Number 47225. Department Form BWP AQ Sound bears the seal and signature of Dale Raczyński, Massachusetts Registered Professional Engineer Number 36207.

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Sections 142A-142N, Chapter 21C, Sections 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory and statutory requirements.

In response to a public petition, accompanied by over one hundred (100) signatures, the Proposed Plan Approval was subject to a 30-day public comment period. A significant number of comments were received and are addressed in the accompanying Response to Comments ("RTC") document.¹ As a result of the comments received, this Plan Approval has been modified from the initial Proposed Plan Approval, as discussed in the RTC.

MassDEP received an updated Application on May 25, 2018. The Application revisions are reflected in this Plan Approval and include: 1) revised turbine startup, shutdown, and transient event emissions, which are based on updated guidance from the turbine manufacturer; 2) revised emissions modeling, which is based on updated background monitor data and meteorological data; 3) updated gas quality data, based on the Facility owner/operator, Algonquin Gas Transmission, LLC's ("Permittee" or "Algonquin") review of

¹ <https://www.mass.gov/service-details/algonquin-natural-gas-compressor-station-weymouth>

gas analyses system-wide; and 4) updated venting emissions, which is based on the Permittee's operating experience with this model turbine compressor at other locations.

A supplemental Sound Impact Assessment Report, with a cover letter dated October 16, 2018, presented revised sound impacts and proposed additional sound mitigation measures, which have been incorporated into this Plan Approval.

Additionally, at the direction of Governor Charles Baker, the Massachusetts Department of Public Health ("DPH") hired a contractor to conduct a Health Impact Assessment ("HIA"), which was finalized on January 4, 2019.² The HIA analyzed: 1) the current health status of the local community; 2) current background air quality near the proposed project site; 3) the potential health effects of the proposed compressor station on residents of surrounding neighborhoods and municipalities and; 4) possible actions to protect and promote community health in the area. In issuing this Plan Approval, MassDEP has considered the results of the HIA and recommendations contained therein. The changes made as a result of the HIA include: 1) restrictions designed to mitigate noise and dust associated with construction of the Project; 2) enhanced blowdown notification; 3) enhanced leak detection requirements; and 4) requirement for submitting a decommissioning plan.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this Plan Approval for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Permittee must comply in order for the Facility to be operated in compliance with this Plan Approval.

1. DESCRIPTION OF FACILITY AND APPLICATION

A. PROJECT DESCRIPTION

Algonquin has proposed the installation and operation of a new natural gas compressor station ("Project"). This Project will support the capacity upgrades and expansion of Algonquin's natural gas transmission pipeline system, which runs from Mahwah, New Jersey to Beverly, Massachusetts for further transportation and deliveries on the Maritimes & Northeast Pipeline, LLC system. Collectively, this is referred to as the Atlantic Bridge Project. On January 25, 2017, the Federal Energy Regulatory Commission ("FERC") approved the Atlantic Bridge Project, which includes siting of this Compressor Station.³

B. FACILITY and EQUIPMENT DESCRIPTION

The Facility consists of the proposed Project, which will be located at an existing site that includes an existing gas metering and regulation ("M&R") station. The Facility is on a 15.9± acre site bounded by Route 3A (Bridge St.), Calpine Fore River Energy Center, and the Fore River.

² <http://foreriverhia.com/documents/>

³ ["Order Issuing Certificate and Authorizing Abandonment," FERC docket No. CP16-9-000](#)

The proposed Project consists of one natural gas compressor driven by one (1) Solar Taurus 60-7802 natural gas fired stationary combustion turbine. The turbine will fire pipeline natural gas as the exclusive fuel. The turbine will have a nominal heat input rating of 61.29 million British thermal units per hour (“MMBtu/hr”), lower heating value (“LHV”); and a nominal power output of 7,700 horsepower (“hp”), which is approximately 5.74 megawatts (“MW”).⁴ The turbine will have a maximum energy input rating of 74.91 MMBtu/hr, higher heating value (“HHV”); a maximum fuel rate of 73,444 standard cubic feet (“scf”) per hour; and a maximum power output of 8,664 hp, which is approximately 6.46 MW.⁵

Exhaust gases from the proposed turbine will be emitted through a stack with an equivalent inside diameter of approximately 9 feet, which provides a nominal exit velocity of 28 feet per second at a nominal temperature of 999 °F. The top of the stack will be at least 60 feet above ground level.

The proposed turbine uses dry low NOx technology, operating under the brand name “SoLoNOx,” which will limit nitrogen oxide (“NOx”) emissions to 9 parts per million by volume, dry basis (“ppmvd”) at 15 percent (%) oxygen (“O₂”) while operating at ambient temperatures above 0 °F. The turbine will be equipped with an oxidation catalyst, which will reduce emissions of carbon monoxide (“CO”) and volatile organic compounds (“VOC”) by 95% and 50%, respectively.⁶ Emissions will not exceed 1.25 ppmvd at 15% O₂ for CO and 2.4 ppmvd at 15% O₂ for VOCs. All emissions factors, which are provided by the manufacturer, have been established as Best Available Control Technology (BACT). All emission rates are guaranteed by the manufacturer during steady-state operation at 50% – 100% load for all ambient temperatures above 0 °F.

Annual and monthly emission limitations from the turbine are based on combined emissions from normal operations at an average annual ambient temperature of 46.65°F⁷, start-up/shutdown, low temperature operation occurring within a temperature range of -20°F and 0°F, and transient events⁸. At low ambient temperatures (i.e. below 0 °F), emissions of NOx, CO, and VOCs will increase. During periods of low temperature, the emissions will be based on the emission factors provided by the manufacturer, which are listed in Table 8B of the Plan Approval. Transient events will be limited to 25 hours per month and 50 hours per consecutive 12-month period. Transient event emissions will be based on the emission factors provided by the manufacturer, which are listed in Table 8C of the Plan Approval.

The turbine’s startup sequence takes approximately 9 minutes from the initial firing to steady-state operation. This includes 3 minutes of ignition-idle operation and 6 minutes of loading / thermal stabilization. During the startup sequence, it is assumed that the oxidation catalyst will not have reached its minimum effective operating temperature and as such, will not have measurable destruction efficiency. Shutdown of the turbine takes approximately 8.5 minutes for loading and thermal stabilization, during which the oxidation catalyst will be at the required temperature to achieve the specified control efficiencies for CO and VOCs. Startup and shutdown emissions, which are supplied by the manufacturer, are listed in Table 8D of this Plan Approval.

⁴ At ISO conditions.

⁵ At -20 degrees Fahrenheit.

⁶ VOC reduction is an overall efficiency based on a weighted average. Refer to Table B-1Aj of the [Air Plan Application](#).

⁷ USEPA TANKS 4.09d program for Worcester, MA (worst case of Worcester, Boston, and Providence, RI).

⁸ Transient events are periods of time when the turbine is operating outside of steady state or at less than 50% load, excluding startup, shutdown, or low temperature events.

As previously indicated, all emission rates are guaranteed by the manufacturer during steady-state operation at 50% – 100% load for all ambient temperatures above 0 °F. When the turbine is operating outside of those conditions (i.e., during transient, startup, shutdown, or low temperature events), the turbine monitoring system will indicate SoLoNO_x is inactive.

The Project will include one new natural gas-fired 585 brake horsepower Waukesha model VGF24GL emergency spark ignition engine generator set. This engine will be subject to requirements of MassDEP's Industry Performance Standards for Emergency Engines and Emergency Turbines at 310 CMR 7.26(42). MassDEP Air Quality regulations at 310 CMR 7.26(42)(e) "Emission Certification, Monitoring and Testing," requires certification under the "Environmental Results Program" at 310 CMR 70.00. Certification shall include a statement from the supplier that the installed engine is capable of complying with the emission limitations for the first three years of operation. A one-time certification is required to be made to MassDEP within 60 days of commencement of operation of the engine.

Fugitive emissions occur at piping components such as pump seals, valves, pipe fittings, and the compressor. Emissions were calculated based on the methodology and emission factors contained in United State Environmental Protection Agency ("EPA") publication [EPA-453/R-95-017](#). Fugitive emissions from piping components will be minimized through the implementation of a Leak Detection and Repair ("LDAR") program. LDAR is a work practice designed to identify leaking equipment so that emissions can be reduced through repairs. Monitoring, at regular intervals, will identify leaking components so repairs can be made within the required timeframe. The LDAR program will use the monitoring and testing methodology that is no less stringent than the LDAR requirements in 40 CFR 60, Subpart OOOOa: Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015. The Permittee will address the use of human senses, including audio, visual, and olfactory ("AVO") on a monthly basis to supplement the required LDAR program.

Additional gas releases associated with the compressor operation occur at the Facility. These routine and non-routine releases are from compressor start-up / shutdown and from maintenance activities.

1. Routine operations, including startup and shutdown of the compressor, result in emissions from the following activities:
 - Case venting related to shutdown of the compressor, except in the event of pressurized holds. When the compressor is taken offline, isolation valves on the inlet and outlet gas lines of the compressor are closed. The pressurized gas remaining in the compressor and associated piping is vented;
 - Gas seal leakage during normal operation and standby shutdown (i.e., compressor seal leakage). Depending on the operating mode of the compressor and the length of time the unit may be in standby mode, the compressor may remain under pressure. If the compressor is in standby mode for a sufficient length of time, compressor seal leakage will result in emissions;
 - Air purges related to startup of the compressor following a depressurization of the unit. Equipment is purged of air and the system is pressurized prior to startup; and
 - Other ancillary activities, including releases from gas-operated pneumatic equipment.
2. Maintenance activities, including startup and shutdown of the compressor, result in emissions from the following activities:
 - Station blowdowns for purposes of major maintenance;

- Case venting related to shutdown of the compressor for purposes of maintenance;
- Air purges related to startup of the compressor following a depressurization of the unit. Equipment is purged of air and the system is pressurized prior to startup;
- Liquid purges related to moving liquids through the pipeline liquids system; and
- Other ancillary activities, including fuel line venting and air purging for ancillary equipment, such as emergency generators, and fuel gas heaters, and valve seat leakage.

3. Pipeline blowdowns:

- Venting of the pipeline section for maintenance purposes.

Incoming gas will be cleaned and any residual moisture will be removed. This collected water will be stored in a condensate storage tank and periodically transported off site. The associated piping and equipment will be included in the aforementioned LDAR program.

Equipment Exempt from Plan Approval

The following ancillary equipment is exempt from this Plan Approval:

Table 1	
Equipment Description	Basis for exemption
Natural gas fired turbine fuel gas heater Heat input rating 0.23 MMBtu/hr	310 CMR 7.02(2)(b)15.a.
5 catalytic space heaters Heat input rating 0.072 MMBtu/hr each	310 CMR 7.02(2)(b)15.a.
Cold degreaser	310 CMR 7.02(2)(b)24. (specifically, 310 CMR 7.03(8), which requires operation in a manner consistent with 310 CMR 7.18(8))
Waukesha model VGF24GL emergency engine generator set	310 CMR 7.02(2)(b)29.b.
Separator vessels (4 units)	310 CMR 7.02(2)(b)11.
Condensate storage tank	310 CMR 7.02(2)(b)11.
Lubricating oil storage tank	310 CMR 7.02(2)(b)11.
Oily water storage tank	310 CMR 7.02(2)(b)11.
Hanover natural gas-fired heater ¹ 9.5 MMBtu/hr	310 CMR 7.02(2)(b)15.a.
NATCO natural gas-fired heater ¹ 6.8 MMBtu/hr	310 CMR 7.02(2)(b)15.a.
Lochinvar natural gas-fired boilers (3 units) ¹ 1.8 MMBtu/hr, each	310 CMR 7.02(2)(b)15.a.

Table 1 Notes:

1. The Hanover gas-fired heater, the NATCO gas-fired heater, and the 3 Lochinvar gas-fired boilers are existing equipment associated with the metering and regulation station.

Table 1 Key:

CMR = Code of Massachusetts Regulations

MMBtu/hr = million British Thermal Units per hour

Sound Impacts and Mitigation

Operation of the Facility will create several sources of sound, which will be mitigated as follows: 1) Insulated / acoustically treated building housing the turbine and compressor; 2) use of a sound suppressant muffler on the turbine exhaust; 3) acoustical pipe insulation for outdoor above ground piping; 4) a silencer for the turbine air intake system; 5) low-noise lube oil coolers; 6) a low-noise gas cooler; 7) a blowdown silencer; and 8) an acoustically treated enclosure housing the emergency engine.

MassDEP requires sound emissions suppression and prevention to prevent unnecessary sound emissions that may cause noise. In the context of Air Plan Approval, MassDEP reviews the sound emissions suppression and prevention aspects of the design, and the analysis of the predicted increase in ambient sound level and any predicted pure tones from Facility operation.

A sound analysis⁹, which was included with the Application as updated, evaluated sound impacts at 7 receptor locations near the Facility as follows:

- Receptor A / Location M1: King's Cove Property Line; represents sound levels at the closest property line immediately east of the Facility, approximately 90 feet east of the center of the compressor building. This location also represents existing sound levels along the walking path that goes through the public park located in the Fore River Basin south of the MWRA pumping Station within the King's Cove conservation area.
- Receptor B / Location M2: Bridge Street; represents sound levels at the nearest residences to the southeast of the Facility, approximately 840 feet from the center of the compressor building.
- Receptor C / Location M3: Monatiquot Street; represents sound levels at the nearest residences to the south of the Facility, approximately 1,300 feet from the center of the compressor building. This location is just within the Fore River Energy Center fence line near the intersection of Monatiquot Street and Bluff Road.
- Receptor D / Location M4: King's Cove Beach Road; represents sound levels at the nearest residences to the east of the Facility along King's Cove Beach Road, approximately 1,530 feet from the center of the compressor building.
- Receptor E / Location M5: City of Quincy Park; represents sound levels at the nearest residences to the west of the Facility in Quincy along Washington Street, located approximately 2,850 feet from the center of the compressor building.
- Receptor F / Location M6: O'Brien Towers; represents sound levels at the nearest group of residences to the north of the Facility. The location is in Quincy on the south lawn of the O'Brien Towers south of Bicknell Street, located approximately 1,740 feet from the center of the compressor building.

⁹ Epsilon Associates, Inc. *Sound Level Impact Assessment Report, Weymouth Compressor Station, Atlantic Bridge Project, Weymouth, Massachusetts*, dated October 15, 2018.

- Receptor G: Germantown; represents sound levels at the nearest group of residences to the north of the Facility in the Germantown neighborhood of Quincy. The location is located approximately 1,420 feet from the center of the compressor building.

MassDEP’s review has found that the sound impacts attributable to the Facility are mitigated to the maximum extent practical. The sound impact analysis indicates that the Facility’s sound impact above ambient background will be as follows:

Table 2					
Identified Receptor	Distance & Direction of Receptor	Measured Ambient Nighttime L90 [dB(A)]	Modeled Sound Level of Facility [dB(A)]	Modeled Facility Level + Lowest Ambient Level [dB(A)]	Increase above Lowest Ambient Level [dB(A)]
A	90 feet (east)	40	47	47	7
B	840 feet (southeast)	36	44	46	8
C	1,300 feet (south)	45	40	46	1
D	1,530 feet (east)	37	31	38	1
E	2,850 feet (west)	34	35	37	3
F	1,740 feet (north)	41	38	43	2
G	1,420 feet (north)	41	38	43	2

Table 2 Notes:

1. Receptor A is the closest Facility property line shared with the King’s Cove Parcel. Though the increase above the nighttime L90 is modeled to be 7 dB(A), the King’s Cove Parcel is not occupied at night. The increase above the daytime L90 is modeled to be 5 dB(A).
2. Background sound level at receptor G is estimated to be equal to the level at receptor F due to their proximity to one another.

Table 2 Key:

dB(A) = decibels, A weighted

L90 = sound level, 90th percentile

In addition to evaluating the predicted increase in broadband ambient sound level attributed to the Facility equipment, relative to pre-Facility ambient, MassDEP also evaluated whether operation of the Facility would cause a “pure tone” condition, defined as any octave band center frequency sound pressure level exceeding the two adjacent center frequency sound pressure levels by 3 decibels or more. A review of the sound analysis and associated supplemental forms submitted with the Application indicate operation of the Facility will not create a pure tone condition.

A post-construction compliance demonstration for sound impacts is required herein.

C. EMISSIONS MODELING

An air dispersion modeling analysis¹⁰ was conducted to demonstrate that the Facility’s ambient air impacts, combined with the pre-existing background levels, will not cause or contribute to a violation of the National Ambient Air Quality Standards (“NAAQS”). The primary standards are health based standards established under the United States Clean Air Act (“CAA”) that are designed to preserve public health and protect sensitive subpopulations, which include people with diseases (e.g. asthma, cardiovascular disease), children, and the elderly with an adequate margin of safety. The Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings

EPA has established Significant Impact Levels (“SILs”), which are numerical values that are used to evaluate the impact that a proposed source may have on the NAAQS. The SIL is the level of ambient impact below which EPA considers a source to have an insignificant impact on air quality. The SILs are a small fraction of the NAAQS and ambient impacts below the SIL are commonly referred to as “de minimis.” If the modeling shows that: 1) the predicted impact of a pollutant is less than the SIL; and 2) the difference between the background ambient air concentration and the NAAQS for that pollutant is greater than the SIL, the predicted impact of that pollutant is deemed insignificant. In these circumstances, MassDEP follows EPA Guidance and concludes that the emissions of that pollutant do not cause or contribute to a violation of the NAAQS without requiring cumulative impact modeling.

Table 3				
Comparison of Maximum Predicted Impacts with Significant Impact Levels				
Pollutant	Averaging Period	Max Impact (µg/m³)	SIL (µg/m³)	Below SIL
NO₂	1-Hour	14.4	7.5	no
	Annual	2.0	1	no
SO₂	1-Hour	6.5	7.8	yes
	3-Hour	6.3	25	yes
	24-Hour	5.5	5	no
	Annual	0.8	1	yes
PM₁₀	24-Hour	2.6	5	yes
PM_{2.5}	24-Hour	2.3	1.2	no
	Annual	0.35	0.3	no
CO	1-Hour	122.8	2,000	yes
	8-Hour	101.0	500	yes

Table 3 Key:

CO = Carbon Monoxide
NO₂ = Nitrogen Dioxide

SO₂ = Sulfur Dioxide
SIL = significant impact level

¹⁰ Trinity Consultants, [Updated Air Dispersion Modeling Report, Algonquin Gas Transmission, LLC., Weymouth Compressor Station](#), revised May 2018.

PM₁₀ = Particulate Matter ≤ 10 microns in diameter µg/m³ = micrograms per cubic meter
PM_{2.5} = Particulate Matter ≤ 2.5 microns in diameter

Since the predicted impacts of SO₂ (1-hour, 3-hour, and annual averaging periods), PM₁₀, and CO are below the SIL, no additional modeling was performed. The predicted impacts of NO₂, PM_{2.5}, and SO₂ (24-hour averaging period) exceed the SIL, so a cumulative impact analysis was performed for these pollutants.

In evaluating cumulative impacts with respect to the NAAQS, maximum modeled impacts were added to representative ambient background concentrations and compared to the applicable NAAQS. The Permittee used background data obtained from MassDEP’s existing monitoring station on Harrison Avenue and Von Hillern Street, both in Boston. The background data, when added to the modeled impacts found that the maximum impacts from emissions from the proposed facility will be below the NAAQS, as indicated below:

Table 4						
Comparison of Predicted Impact Concentrations with NAAQS						
Pollutant	Averaging Period	Algonquin Compressor Station Impact (µg/m³)¹	Measured Background (µg/m³)²	Background plus Compressor Station Total Impact (µg/m³)	NAAQS (µg/m³)	Background plus Compressor Station % of NAAQS
NO₂	1-Hour	81.41	94.63	176.04	188	93.6%
	Annual	8.52	32.88	41.40	100	41.4%
SO₂	24-Hour	18.41	13.4	31.81	365	8.7%
	24-Hour	7.13	15.3	22.43	35	64.1%
	Annual	1.47	6.5	7.97	12	66.4%

Table 4 Notes:

1. Represents the cumulative impact of Facility and regional sources.
2. Massachusetts 2016 Air Quality Report (<https://www.mass.gov/lists/massdep-air-monitoring-plans-reports-studies#massachusetts-annual-air-quality-reports->)

Table 4 Key:

NAAQS = National Ambient Air Quality Standards PM = Particulate Matter
NO₂ = Nitrogen Dioxide PM_{2.5} = Particulate Matter ≤ 2.5 microns in diameter
SO₂ = Sulfur Dioxide % = percent
µg/m³ = micrograms per cubic meter

The air dispersion modeling analysis also included an evaluation of the Facility’s impacts relative to MassDEP’s 24-hour Threshold Effects Exposure Limits (“TELs”) and annual Allowable Ambient Limits (“AALs”) Guideline values for air toxics. The AALs and TELs were evaluated from Facility-wide sources at both 50% and 100% turbine load.

Non-Threshold Effects Exposure Limits (“NTELS”) are based on known or suspected carcinogenic health effects. The NTEL is a concentration associated with a one in a million excess lifetime cancer risk over a

lifetime of continuous exposure; and TELs are based on non-cancer health effects. The TEL is a concentration intended to protect the general population, including sensitive populations such as children, from adverse health effects over a lifetime of continuous exposure. TELs take into account that people may be exposed to a chemical from other sources, including indoor air, food, soil and water.

MassDEP compares the NTEL and the TEL and designates the lower concentration as the AAL. Since, in general, NTEs are lower than TELs, most AALs are based on the NTEL, or risk of excess cancer. For chemicals that do not pose cancer risks, the AAL is based on the TEL, and in this case the published AAL and TEL values are the same.

AALs and TELs represent screening-level guidelines that indicate the maximum ambient air concentration of a toxic pollutant that may be contributed by a single source or facility. Therefore, the modeling does not take into account background or other unrelated sources.

Table 5						
Pollutant	TEL (24-hour)			AAL (annual)		
	TEL Limit ($\mu\text{g}/\text{m}^3$)	Modeled concentration ($\mu\text{g}/\text{m}^3$)	percent of limit¹	AAL Limit ($\mu\text{g}/\text{m}^3$)	Modeled concentration ($\mu\text{g}/\text{m}^3$)	percent of limit¹
Acetaldehyde	30	6.01E-02	0.2	0.40	8.04E-03	2.0
Acrolein	0.07	3.71E-02	53.0	0.07	4.94E-03	7.1
Benzene	0.6	2.17E-01	36.2	0.1	4.27E-02	42.7
1,3 Butadiene	1.20	1.93E-03	0.2	0.003	2.60E-04	8.7
Carbon tetrachloride	85.52	2.60E-04	0.0	0.07	4.00E-05	0.1
Chlorobenzene	93.88	2.20E-04	0.0	6.26	3.00E-05	0.0
Chloroform	132.76	2.10E-04	0.0	0.04	3.00E-05	0.1
Dichloromethane	100.00	1.40E-04	0.0	60.00	2.00E-05	0.0
Diphenyl	0.34	1.53E-03	0.5	0.09	2.00E-04	0.2
Ethylbenzene	300	7.87E-01	0.0	300	1.55E-02	0.0
Formaldehyde	2.00	3.86E-01	19.3	0.08	5.56E-02	69.5
Methanol	7.13	1.80E-02	0.3	7.13	2.39E-03	0.0
2-Methylnaphthalene	14.25	2.40E-04	0.0	14.25	3.00E-05	0.0
Naphthalene	14.25	2.91E-03	0.0	14.25	2.40E-04	0.0
Phenol	52.33	1.70E-04	0.0	52.33	2.00E-05	0.0
Propylene oxide	6.00	6.37E-02	1.1	0.30	6.43E-03	2.1
Styrene	200	1.70E-04	0.0	2	2.00E-05	0.0
1,1,2,2 Tetrachloroethane	18.67	3.10E-04	0.0	0.02	4.00E-05	0.2
Toluene	80	5.60E-01	0.7	20	1.11E-01	0.6
1,1,2 Trichloroethane	14.84	2.30E-04	0.0	0.06	3.00E-05	0.1
Vinyl chloride	3.47	1.10E-04	0.0	0.38	1.00E-05	0.0
xylene	11.8	7.86E-01	6.7	11.8	1.54E-01	1.3

Table 5 Notes:

1. – Modeled concentration as a percent of limit.

Table 5 Key:

AAL = Allowable Ambient Limit

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

TEL = Threshold Effects Exposure Limit

Based upon a review of the modeling analysis contained in the application, maximum impacts from emissions from the proposed Facility will be below the AALs / TELs.

D. REGULATORY and STATUTORY APPLICABILITY

The Permittee has indicated that the Project and emission units therein are subject to and will comply with the EPA’s New Source Performance Standards (“NSPS”) and National Emissions Standards for Hazardous Air Pollutants (“NESHAPs”) and MassDEP’s Industry Performance Standards, as follows:

Table 6		
Affected Unit	Applicable Regulation	Title
Combustion turbine	40 CFR part 60 subpart KKKK	Standards of Performance for Stationary Combustion Turbines
Compressor station	40 CFR part 60 subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015
Emergency engine ¹	310 CMR 7.26(42)	Industry Performance Standards – Engines and Combustion Turbines
	40 CFR part 60 subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines
	40 CFR part 63 subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

Table 6 Notes:

1. The emergency engine is exempt from plan approval; refer to Table 1 of this document for basis.

Table 6 Key:

CFR = Code of Federal Regulations

CMR = Code of Massachusetts Regulations

The Permittee is advised that MassDEP has not accepted delegation for 40 CFR part 60 subpart JJJJ, subpart KKKK, or subpart OOOOa, or 40 CFR part 63 subpart ZZZZ. The Permittee is advised to consult with EPA regarding the requirements of the NSPS and NESHAPs.

E. GLOBAL WARMING SOLUTIONS ACT

Section 7 of chapter 298 of the acts of 2008, the Global Warming Solutions Act states “In considering and issuing permits, licenses and other administrative approvals and decisions, the respective agency, department, board, commission or authority shall also consider reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise.” Although, under EEA policy, a GHG analysis is performed at MEPA for only those projects that are large enough to qualify for MEPA review and agencies are then directed to include findings pursuant to Section 7 of the GWSA, incorporated into Section 61 of MEPA, MassDEP conducted additional analysis of all aspects of the Facility to address reasonably foreseeable climate change impacts.

MassDEP evaluated additional greenhouse gas emissions in its consideration of reasonably foreseeable climate change. The evaluation of additional greenhouse gas emissions included a review of power source and found that the turbine was the most effective means of providing power for the compressor. A gas-fired Solar Taurus 60-7802 turbine equipped with lean pre-mix technology would ensure that emissions of CO₂, a greenhouse gas, are minimized.

Natural gas contains methane, which is a greenhouse gas. This Plan Approval includes a requirement for a Leak Detection and Repair program, which will ensure that natural gas emissions from piping leaks are identified and repaired in a timely manner.

Additionally, the Facility is subject to the New Source Performance Standards at 40 CFR Part 60, Subpart OOOOa “Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015.” This subpart, which is administered by EPA, includes design and operation standards for the purpose of minimizing greenhouse gas emissions.

The Facility is at an elevation of 19 feet above sea level which will help ensure the Facility is not adversely impacted by the effects of sea level rise.

F. ENVIRONMENTAL JUSTICE

On January 30, 2017, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) adopted an updated Environmental Justice Policy (“EJ Policy”) that requires MassDEP to make environmental justice an integral consideration in the implementation and enforcement of laws, regulations, and policies. The enhanced public participation / enhanced analysis requirements of the EJ Policy apply when the project / project site meet both thresholds:

- (1) Any project that exceeds an Environmental Notification Form (“ENF”) / Environmental Impact Report (“EIR”) threshold for air, solid and hazardous waste (other than remediation projects), or wastewater and sewage sludge treatment and disposal at 301 CMR 11.00; **and**
- (2) The project site is located within one mile of an EJ Population (or in the case of projects exceeding an ENF / EIR threshold for air, within five miles of an EJ Population).

The EEA Geographic Information System includes environmental justice areas divided by block groups based on the 2010 US Census data. Based on environmental justice mapping completed by EEA, the Facility is within 5 miles of a number of environmental justice communities in the Towns of Weymouth, Braintree, Quincy, Randolph, and the City of Boston.

This Project does not, however, exceed any ENF / EIR threshold at 301 CMR 11.00.

Because this Project only meets one of the two applicability thresholds, the EJ Policy is not applicable.

2. EMISSION UNIT IDENTIFICATION

Each Emission Unit (“EU”) identified in Table 7 is subject to and regulated by this Plan Approval:

Table 7			
EU	Description	Design Capacity	Pollution Control Device (PCD)
1	Solar Taurus 60 natural gas fired compressor turbine	7,700 hp / 5.74 MW (nominal) ¹ 8,664 hp / 6.46 MW (peak) ²	Oxidation catalyst
2	Venting (gas releases)	Not applicable	none
3	Piping components	Not applicable	LDAR program

Table 7 Notes:

1. At ISO conditions.
2. At -20 degrees Fahrenheit.

Table 7 Key:

EU = Emission Unit Number

hp = horsepower

ISO = International Organization for Standardization

LDAR = Leak Detection and Repair

MW = megawatts (mechanical)

PCD = Pollution Control Device

3. APPLICABLE REQUIREMENTS

A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Tables 8A, 8B, 8C, and 8D:

Table 8A Standard Operating Conditions			
EU	Operational / Production Limit	Air Contaminant	Emission Limit ^{1, 2, 3}
1	1. 54.64 MMscf natural gas per month	NOx	9 ppmvd at 15% O ₂
	2. 592.23 MMscf natural gas per consecutive 12-month period		0.94 tpm
	3. Natural gas shall be the exclusive fuel of use		10.03 tpy
	4. Minimum temperature at inlet of catalyst bed ≥ 880°F (hourly average basis) 5. Minimum pressure drop across the catalyst bed ≥ 2.83 in. W.C. (hourly average basis)	CO	1.25 ppmvd at 15% O ₂ 2.18 tpm 17.28 tpy
		VOC	2.4 ppmvd @ 15% O ₂ 0.30 tpm 2.64 tpy
		HAP (single)	0.05 tpm 0.42 tpy
		HAP (total)	0.1 tpm 0.80 tpy
	6. None	SO ₂	14.29 lb/MMscf (HHV) 0.37 tpm 4.23 tpy
	7. None	PM	0.0066 lb/MMBtu (HHV) 0.18 tpm 1.99 tpy
		PM ₁₀	
		PM _{2.5}	
	8. None	Opacity	Less than 5%, except 5% to less than 10% for up to 2 minutes during any one hour
2	9. Monthly emissions established in accordance with equation 1	VOC	3.19 tpm 3.54 tpy
		HAP (single)	0.05 tpm 0.06 tpy
	10. Annual emissions established in accordance with equation 2	HAP (total)	0.10 tpm 0.11 tpy

Equation 1:

$$m_{\text{Pollutant}_{\text{month}}} = Q_{\text{Gas}_{\text{month}}} \rho_{\text{Gas}_{\text{monthly average}}} \text{wt}\%_{\text{Pollutant}_{\text{monthly average}}}$$

Equation 2:

$$m_{\text{Pollutant}_{\text{consecutive 12-month period}}} = \sum_{\text{month}=1}^{\text{consecutive 12-month period}} m_{\text{Pollutant}_{\text{month}}}$$

m = mass of pollutant, in pounds $wt\%$ = weight percent of pollutant in natural gas
 Q = quantity of natural gas in standard cubic feet ρ = density of natural gas in pound per standard cubic feet

Table 8B Low Temperature Operation ⁴			
EU	Air Contaminant	Emission Limit	
		0°F ≥ Temp ≥ -20°F	Temp ≤ -20°F
1	NOx	11.36 lb/hr	32.46 lb/hr
	CO	0.82 lb/hr	1.24 lb/hr
	VOC	0.52 lb/hr	0.77 lb/hr
	PM/ PM ₁₀ / PM _{2.5}	0.49 lb/hr	0.49 lb/hr
	SO ₂	1.05 lb/hr	1.05 lb/hr

Table 8C Transient Events ^{5,8}			
EU	Operational / Production Limit	Air Contaminant	Emission Limit
1	1. Operations during transient events (operation with SoLoNOx inactive, not including startup, shutdown, or low temperature events), not to exceed 25 hours per month and 50 hours in any consecutive 12-month period	NOx	32.46 lb/hr
		CO	1.24 lb/hr
		VOC	0.77 lb/hr

Table 8D				
Startup / Shutdown Emissions ⁶				
EU	Operational / Production Limit	Air Contaminant	Startup	Shutdown ⁶
1	1. Operation during startups (from first combustion of fuel to when SoLoNOx is active, but not to exceed 30 minutes)	NOx	0.80 lb/event	0.93 lb/event
	2. Operation during shutdowns (from when SoLoNOx is inactive to flame out, but not to exceed 30 minutes)			
	3. Operation during startups (from first combustion of fuel to when the temperature at the inlet to the catalyst bed reaches at least 880 °F, but not to exceed 30 minutes)	CO	77.24 lb/event	4.23 lb/event
	4. Operation during shutdowns (from initial lowering of	VOC	5.40 lb/event	2.62 lb/event

Table 8D Startup / Shutdown Emissions ⁶				
EU	Operational / Production Limit	Air Contaminant	Startup	Shutdown ⁶
	turbine fuel combustion rate with the intent to cease operation to flame out, but not to exceed 30 minutes)			

Table 8A, 8B, 8C, and 8D Key:

CMR = Code of Massachusetts Regulations

CO = Carbon Monoxide

EU = Emission Unit Number

°F = degrees Fahrenheit

HAP (single) = maximum single Hazardous Air Pollutant

HAP (total) = total Hazardous Air Pollutants

HHV = higher heating value

in WC= inches water column

lb = pounds

lb/event = pounds per event

lb/hr = pounds per hour

lb/MMBtu = lbs per million British Thermal Units

lb/MWh = pounds per megawatt hour

LDAR = Leak detection and repair

MMBtu million British Thermal Units

MMscf = million standard cubic feet

NO_x = Nitrogen Oxides

O₂ = oxygen

PM = Particulate Matter

PM_{2.5} = Particulate Matter ≤ 2.5 microns in diameter

PM₁₀ = Particulate Matter ≤ 10 microns in diameter

ppmvd = parts per million by volume, dry basis

Scf = standard cubic feet

SO₂ = Sulfur Dioxide

Temp = temperature

TPM = tons per month

TPY = tons per consecutive 12-month period

VOC = Volatile Organic Compounds

≥ greater than or equal to

≤ less than or equal to

Table 8A, 8B, 8C, and 8D Notes:

1. Monthly turbine emission limits are combined emissions based on normal operation at an average annual ambient temperature of 46.65°F, start-up/shutdown, low temperature operation during a temperature range of -20°F to 0°F, and transient events.
2. Annual turbine emissions are combined emissions based on normal operation at an average annual ambient temperature of 46.65°F, start-up/shutdown, low temperature operation during a temperature range of -20°F to 0°F, and transient events.
3. Compliance with the emission limits based on the applicable EPA reference test method.
4. Turbine emissions associated with low temperature operation are to be included when determining monthly and annual emissions.
5. Turbine emissions associated with transient events are to be included when determining monthly and annual emissions.

6. Emissions associated with startups and shutdowns are to be included when determining monthly and annual emissions.
7. The shutdown emission limits for VOC and CO are based on the oxidation catalyst being operational.
8. Transient events are periods of operation when the turbine is operating outside of steady state or when operating at less than 50% load, excluding startup and shutdown events.

B. COMPLIANCE DEMONSTRATION

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 9, 10, and 11:

Table 9	
EU	Monitoring and Testing Requirements
1	1. The Permittee shall continuously monitor the turbine inlet temperature at all times that the turbine is operated.
	2. The Permittee shall continuously monitor the quantity of natural gas combusted in the turbine.
	3. The Permittee shall continuously monitor: <ol style="list-style-type: none"> a. the temperature at the inlet of the oxidation catalyst bed, b. the pressure drop across the oxidation catalyst bed.
	4. The Permittee shall monitor the number of startups and shutdowns of the turbine and the duration of each event.
	5. The Permittee shall monitor the number of transient events and the duration of each event, as indicated by SoLoNOx inactive status, not including startup, shutdown, and low temperature events, which are monitored separately.
	6. Within 60 days of achieving maximum production rate, but no later than 180 days of startup, the Permittee shall conduct initial compliance testing for the emission unit. The testing shall be conducted on a date mutually agreed upon with MassDEP. Testing shall be conducted for NOx, CO, VOC, and PM _{2.5} to determine the compliance status with the ppmvd, lb/MMBtu and lb/hr for standard operating conditions as listed in Table 8A. The performance test shall be done at any load condition within plus or minus 25 percent of 100 percent of peak load. The Permittee may perform testing at the highest achievable load point, if at least 75 percent of peak load cannot be achieved in practice. The Permittee shall conduct subsequent testing every two (2) years from the date of the initial compliance test. During the initial compliance test, the Permittee shall conduct testing for benzene and formaldehyde to ensure the emissions do not exceed the emission rates contained in the application.
	7. In order to demonstrate compliance with the applicable fuel sulfur requirement, the Permittee shall utilize a current, valid purchase contract, tariff sheet or transportation contract for natural gas that shall specify the maximum total sulfur content of the natural gas used at the Facility.

Table 9	
EU	Monitoring and Testing Requirements
2	8. The Permittee shall monitor the date, time, duration, and quantity of gas released for each gas release event.
3	9. The Permittee shall monitor the piping components in accordance with the LDAR program on a quarterly basis. Refer to Special Terms and Conditions, Table 12 Provisions 4 through 6.
Facility-wide	10. The Permittee shall monitor all operations to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	11. If and when MassDEP requires it, the Permittee shall conduct emission testing in accordance with EPA Reference Test Methods and Regulation 310 CMR 7.13.
	12. The Permittee shall conduct sound impact testing to demonstrate that the Facility does not cause any sound impacts in excess of Table 2, column 5 of this Plan Approval. This testing may be conducted concurrently with FERC's required sound impact testing. The sound impact testing shall be conducted within 90 days of the of the Project commencing commercial operation or in a timeframe as required by FERC, whichever comes later. In three years, but no more than 39 months after the date of the initial sound impact testing, the Permittee shall conduct additional sound impact testing at the Facility.

Table 9 Key:

CMR = Code of Massachusetts Regulations

CO = Carbon Monoxide

EU = Emission Unit Number

FERC = Federal Energy Regulatory Commission

lb/hr = pounds per hour

lb/MMBtu = pounds per million British Thermal Units

MassDEP = Massachusetts Department of Environmental Protection.

NO_x = Nitrogen Oxides

PM = Total Particulate Matter

PM₁₀ = Particulate Matter ≤ 10 microns in diameter

PM_{2.5} = Particulate Matter ≤ 2.5 microns in diameter

ppmvd = parts per million by volume, dry basis

VOC = Volatile Organic Compounds

EPA = United States Environmental Protection Agency.

≤ = less than or equal to

Table 10	
EU	Record Keeping Requirements
1.	1. The Permittee shall maintain average hourly records of the turbine inlet temperature at all times that the turbine is operated. The record shall indicate the actual ambient temperature for each hour the turbine is in operation. On days when the temperature never drops below 0 °F, the record may indicate the average daily temperature.
	2. The Permittee shall maintain records of the daily, monthly, and annual gas flow to the turbine.

Table 10	
EU	Record Keeping Requirements
	<p>3. The Permittee shall maintain records of:</p> <ul style="list-style-type: none"> a. the hourly average inlet temperature of the oxidation catalyst bed, b. the hourly average pressure drop across the oxidation catalyst bed.
	4. The Permittee shall maintain records of each transient event, the duration of each event, and associated emissions, separate from startup, shutdown, and low temperature events.
	5. The Permittee shall maintain records of each startup, shutdown, the duration of each event, and associated emissions.
	6. The Permittee shall maintain records of the status of SoLoNOx mode at all times that the unit is in operation.
	7. The Permittee shall maintain records of the date, time, duration and quantity of natural gas emitted for each gas release event.
2.	<p>8. The Permittee shall maintain the following records:</p> <ul style="list-style-type: none"> a. the date of each LDAR inspection, b. the date of each AVO inspection, c. components monitored, d. leaks identified, e. date of each repair, f. date of re-monitoring to validate repairs, g. an up to date Delay of Repair list, including the basis for being on the list, h. any additional items to document compliance with the LDAR program.
3.	<p>9. The Permittee shall maintain adequate records to demonstrate compliance status with all operational, production, and emission limits contained in Table 8A, above. Records shall also include the actual emissions of air contaminants emitted for each calendar month and for each consecutive 12-month period (current month plus prior eleven months). These records shall be compiled no later than the 15th day of the month following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be downloaded at http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping. The Permittee may propose an alternative record keeping spreadsheet for approval by MassDEP.</p>
Facility-wide	10. The Permittee shall maintain records of monitoring and testing as required by Table 9.
	11. The Permittee shall maintain a copy of this Plan Approval, underlying Application and updates and the most up-to-date SOMP for the EU(s) and PCDs approved herein.
Facility-wide	12. The Permittee shall maintain a record of routine maintenance activities performed on the approved EU(s), PCD(s) and monitoring equipment. The records shall include, at a minimum, the type or a description of the maintenance performed and the date and time the work was completed.

Table 10	
EU	Record Keeping Requirements
	13. The Permittee shall maintain a record of all malfunctions affecting air contaminant emission rates on the approved EUs, approved PCDs and monitoring equipment. At a minimum, the records shall include: date and time the malfunction occurred; description of the malfunction; corrective actions taken; the date and time corrective actions were initiated and completed; and the date and time emission rates and monitoring equipment returned to compliant operation.
	14. The Permittee shall maintain records to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	15. The Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	16. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.
	17. All records required herein shall be maintained on-site. Alternatively, electronic records may be maintained at a remote location, provided the records are readily available upon request.

Table 10 Key:

CMR = Code of Massachusetts Regulations

EU = Emission Unit

°F = degrees Fahrenheit

LDAR = Leak Detection and Repair

MassDEP = Massachusetts Department of
Environmental Protection.

PCD = Pollution Control Device

SOMP = Standard Operating and Maintenance
Procedure

EPA = United States Environmental Protection
Agency

Table 11	
EU	Reporting Requirements
Facility-wide	1. The Permittee shall notify MassDEP upon commencement of construction, upon initial startup, and upon commencement of commercial operation of the equipment approved herein. Each notification shall be made within 30 days of the respective milestone.
Facility-wide	2. The Permittee shall notify MassDEP prior to any scheduled maintenance events expected to result in a blowdown with volume expected to be greater than 10,000 scf. The notification shall include the date(s), anticipated time(s), and expected duration of the blowdown(s). The notification shall identify the estimated quantity of emissions from the blowdown, steps taken to minimize emissions, and steps taken to minimize any potential nuisance impacts. This notification shall be provided to MassDEP no later than 48 hours prior to the event. The Permittee shall provide the Town of Weymouth, City of Quincy, Town of Braintree, and Town of Hingham a copy of this notification.
	3. The Permittee shall notify MassDEP of any unplanned releases with a volume greater than 10,000 scf within 2 business days of said event.

Table 11	
EU	Reporting Requirements
	4. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a “Responsible Official” as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).
	5. The Permittee shall notify the Southeast Regional Office of MassDEP, BAW Air Permit Chief by telephone: 508-946-2824, email: Sero.Air@mass.gov, or fax : (508) 946-2865, as soon as possible, but no later than three (3) business day after discovery of any exceedance of Table 8A, 8B, or 8C requirements. A written report shall be submitted to the Air Permit Chief at MassDEP within ten (10) business days of the notification and shall include: identification of exceedance, duration of exceedance, reason for the exceedance, corrective actions taken, and action plan to prevent future exceedance.
	6. The Permittee shall report to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. The Permittee shall note therein any minor changes (under 310 CMR 7.02(2)(e), 7.03, 7.26, etc.), which did not require Plan Approval.
	7. The Permittee shall submit to MassDEP for approval, a pretest protocol at least 30 days prior to testing for any sound impact or emissions testing required in this Plan Approval.
	8. The Permittee shall submit to MassDEP, a final test results report, within 45 days after testing, for all sound impact or emissions testing required in this Plan Approval.

Table 11 Key:

EU = Emission Unit

MassDEP = Massachusetts Department of
Environmental Protection.

CMR = Code of Massachusetts Regulations

scf = standard cubic feet

4. SPECIAL TERMS AND CONDITIONS

- A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 12 below:

Table 12	
EU	Special Terms and Conditions
1	1. The oxidation catalyst shall not be by-passed at any time.
	2. The oxidation catalyst shall be operated and maintained in accordance with the manufacturer’s recommendations. A copy of the manufacturer’s recommended standard operating and maintenance procedures shall be submitted to MassDEP within 30 days of commencement of commercial operation.

Table 12	
EU	Special Terms and Conditions
	3. The turbine and associated compressor shall be operated and maintained in accordance with the manufacturer's recommendations.
3.	<p>4. Prior to initial startup, the Permittee shall submit a Leak Detection and Repair (LDAR) program for MassDEP review and approval. The LDAR program is in addition to any specific LDAR criteria established in this Plan Approval and at a minimum shall include:</p> <ul style="list-style-type: none"> a. a system to identify every component that requires monitoring, b. leak definition, which includes, but is not limited to, any audible, visual, or olfactory ("AVO") standards. This is in addition to the standards defined in this Plan Approval, c. monitoring requirements and frequency, d. repair requirements, which shall include standards for initial repair, final repair, and any standards to place an item on a Delay of Repair list, e. employee training, f. recordkeeping. g. Monthly AVO inspection. <p>Except as specifically required herein, the LDAR program shall be consistent with and no less stringent than the leak detection and repair requirements contained in 40 CFR 60 subpart OOOOa. Any changes to the LDAR program shall be submitted to MassDEP prior to implementation.</p> <p>5. For piping components in natural gas service, a leak shall be emissions in excess of the following:</p> <ul style="list-style-type: none"> a. For valves and connectors: any detected concentration 500 ppmv, or greater b. For optical gas imaging: any detected emissions. <p>6. For piping components in pipeline liquids service, a leak shall be emissions in excess of the following:</p> <ul style="list-style-type: none"> a. For valves and connectors: any detected concentration 500 ppmv, or greater b. For pump seals: any detected concentration 10,000 ppmv, or greater
Facility-wide	7. All scheduled maintenance at the Facility, with anticipated sound impacts, including, but not limited to servicing of the turbine, compressor, emergency engine and all associated activities such as case venting shall be conducted during daytime hours. The Permittee shall provide reasonable notification to the Town of Weymouth prior to the maintenance activities. The Permittee shall provide notice to the Town of Weymouth as soon as it becomes apparent that the scheduled maintenance cannot be completed during daytime hours.

Table 12

EU	Special Terms and Conditions
	<p>8. The Permittee shall take the steps necessary to mitigate dust from the initial construction of the Project. These steps shall include, but not be limited to:</p> <p>Unpaved areas and access roads</p> <ol style="list-style-type: none"> Apply water when needed; Control track-out; Maintain appropriate low vehicle speeds (5 miles per hour) in unpaved areas; Route vehicles and equipment to covered surfaces (e.g., paved or graveled) when possible; Prevent motor vehicle use when unnecessary in unpaved areas; and Remove soil from the exteriors of vehicles and construction equipment prior to moving off of the right-of-way and other work sites. <p>Soil excavation and handling</p> <ol style="list-style-type: none"> Load haul trucks such that the load is below the freeboard; Cover loads as necessary; Prevent spillage; Apply water when needed prior to disturbance and during disturbance to prevent dust generation; Maintain existing ground coverings (e.g., existing pavement) until disturbance is required for construction and stabilize exposed soil with gravel or other stabilizing material, if dust generation is observed that cannot be controlled with water; and Discontinue construction activities if generation of dust is observed until dust control is applied. <p>9. The Permittee shall take the steps necessary to mitigate noise resulting from the initial construction activities. These steps shall include, but not be limited to:</p> <ol style="list-style-type: none"> Construction activities that produce noise, which could create a nuisance condition, will be limited to the daytime hours of 7 am to 7 pm, Monday through Saturday. Construction equipment will be well maintained and vehicles with internal combustion engines equipped with mufflers will be routinely checked to ensure they are in good working order. Construction equipment and vehicles equipped with backup alarms will use quieter-type adjustable backup alarms, where permissible. Portable noise barriers and enclosures will be used when appropriate. A noise complaint hotline will be made available to address any noise-related issues. <p>The Permittee shall provide notice to the Town of Weymouth and MassDEP upon the determination that an activity cannot reasonably be completed by 7 pm. The limitation on the hours of construction does not apply to commissioning activities, but the Permittee shall provide 48 hours advance notice to the Town of Weymouth and MassDEP prior to commencement of any commissioning activity that will occur outside the hours of 7 am to 7 pm.</p>
Facility-wide	<p>10. Upon closure of the Facility, the Permittee shall provide MassDEP and the Town of Weymouth copies of the decommissioning plans required by the Federal Energy Commission and the United States Department of Transportation. MassDEP reserves the right to use its own regulatory authority to ensure that all MassDEP requirements are appropriately addressed.</p>

Table 12 Key:

EU = Emission Unit
ppmv = parts per million by volume
≤ = less than or equal to

LDAR = Leak Detection and Repair
% = percent

- B. The Permittee shall install and use an exhaust stack, as required in Table 13, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including, but not limited to, rain protection devices known as “shanty caps” and “egg beaters.”
- C. The Permittee shall install and utilize exhaust stacks with the parameters as contained in Table 13, for the Emission Units that are regulated by this Plan Approval:

Table 13				
EU	Minimum Stack Height Above Ground (feet)	Nominal Stack Inside Exit Dimensions (feet)	Nominal Stack Gas Exit Velocity Range (feet per second)	Nominal Stack Gas Exit Temperature Range (°F)
1	60	9 ^{note 1}	25 – 28	865 - 999
2	Various			
3	No stack			

Table 13 Key:

EU = Emission Unit

°F = Degree Fahrenheit

Table 13 Notes:

1. Equivalent diameter for rectangular stack

5. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

- A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition, including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition.
- B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.

- C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.
- D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or EPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.
- E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.
- F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.
- G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.
- H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.
- I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.
- J. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

In a letter dated March 15, 2016 and in a follow-up letter dated May 31, 2016 to the Secretariat of the Executive Office of Energy and Environmental Affairs (“EOEEA”), the Town of Weymouth requested an advisory opinion on the applicability of this proposed Project to review under the Massachusetts Environmental Policy Act (“MEPA”). The request for Advisory Opinion requested MEPA invoke the Fail-Safe provisions, requiring the proposed project go through the MEPA review process. Secondly, the request for Advisory Opinion indicated that the Project may have been improperly segmented from the proposed Access Northeast Project¹¹. The request for Advisory Opinion was published in the June 8, 2016 Environmental Monitor for public review and comment, subject to a 20-day comment period.

In a letter dated July 11, 2016 to the Mayor of the Town of Weymouth, the Secretariat of the EOEEA concluded “that the project is not subject to MEPA review and the project does not meet the criteria for invoking Fail-Safe Review.” Additionally, a determination was made that the Atlantic Bridge Project and

¹¹ On June 29, 2017 Algonquin withdrew the application for the Access Northeast Project from FERC.

the Access Northeast Project “are sufficiently distinct in purpose, design, and scope that they have independent utility and can be reviewed separately.”

This final document copy is being provided to you electronically by the
Department of Environmental Protection. A signed copy of this document
is on file at the DEP office listed on the letterhead.

Thomas Cushing
Permit Chief
Bureau of Air and Waste

Enclosure

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